HULL ROYAL INSTITUTION.

THE ANNUAL

REPORT OF THE COUNCIL

AND

TRANSACTIONS

OF THE

Hull Literary & Philosophical Society

FOR THE

SESSION 1878—1879.

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MDCCCLXXIX.

CONTENTS.

FIFTY-SIXTH ANNUAL GENERAL MEETING

OF THE

Hull Literary & Philosophical Society,

Held at the Royal Institution, 2nd May, 1879.

Dr. Rollit, President of the Society, in the Chair.

THE Minutes of the last General Meeting were read and confirmed, after which the President read the Report of the Council as follows :—

The Council have once more the pleasure of reporting continued, and even increased, progress and prosperity in every department of the Institution.

The financial position of the Society is in every respect most satisfactory. Notwithstanding certain items of exceptional outlay, amounting to about £95, the net balance of the income over the expenditure of the past year has been no less than £343 14s. 1d., or, without these deductions, £437 9s. 0d., as it was £286 1s. 7d. in 1877-8, and £322 19s. 3d. in 1876-7.

The surplus income in the last three years' working has thus been about £1,000, a result which is chiefly due to the fact that the number of Members and Subscribers has been nearly doubled since 1876, to the greater popularity of the Sessional and Saturday Afternoon Lectures, and to the acquisition of the Waltham-street property.

During the year the number of Members has been again greatly increased, 4 Honorary, 7 Life, and 130 Ordinary Members having been elected, making the present total number of Members and Subscribers 747, as compared with 416 in 1875-6, 516 in 1876-7, and 665 in 1877-8, figures which show not only great, but sustained, progress.

Although these additions may have been occasionally a cause of inconvenience, the Council must remind the Society that it is almost

entirely dependent on this source of income, that its more extended and better work is thus alone rendered possible (especially since the more frequent use of the Lecture Hall necessarily restricts its being let for other purposes), and that a policy of limitation upon the usefulness of the Institution, as opposed to that of its development, is one which ought not to be adopted if the necessity can by any possibility be avoided. Moreover, the issue of only one extra ticket for one or two of the more attractive Lectures, and the requirement of a small payment for admission to some few others, has nearly always had the effect of preventing undue crowding, while the privileges of the members have not been lessened, inasmuch as the number of Free Lectures, viz., 20, has been fully equal to that of any previous year.

The Council are of opinion (after the experience of the last few years), that the Members should continue to be admitted in all cases without any charge, but that the number of orders may fairly be reduced in certain cases, the present average cost of admission being ridiculously small, viz., about 3d. each. The desirability of retaining the class of Season Ticket-holders (who are few in number) is also open to question.

It may be mentioned that in order to increase the comfort of the larger audiences of recent years the ventilation of the Lecture Hall has been carried out on the most modern principles, and the system adopted has been found to answer its purpose.

The Syllabus of Sessional Lectures, of which no less than 28 have been delivered (including 2 to the Working Classes), has not merely been much less expensive than usual, the net cost having been only £126 17s. 7d., but has proved exceptionally attractive, 13,634 persons having attended the course,—in itself an emphatic testimony to its literary and scientific excellence.

The Session was opened by the President's Conversazione, of which the programme was as follows :—

CONVERSAZIONE OF THE PRESIDENT AND MRS. A. K. ROLLIT,
In the Royal Institution, on Tuesday, Nov. 5th, 1878.

PROGRAMME.

In the Lecture Hall, at 8.30 p.m. and 9.30 p.m.:—The Phonograph, the Microphone, the Telephone, Electrical and other Experiments, Electric Diver's Lamp, Apps' Large Induction Coil (twenty-inch spark in air), the Electric

Light (sixty Grove's Cells and Serrin Automatic Lamp), the Jablochkoff Candle, the Magnesium Lamp, the Phoneidoscope, Sensitive Flames, Vortex Rings, &c., &c.

In the Museum and Art Gallery.—Instrumental Music by Members of the Arion Band, Electrotype reproductions of the following Historic Scientific Apparatus (specially lent from South Kensington) :—Tycho Brahe's Astronomical Quadrant, A.D., 1546 ; Otto Von Guericke's Air Pump, A.D., 1602 ; Magdeburg Hemispheres, A.D., 1602 ; Electro-Magnetic Engines, Telephones, Telegraph Instruments, Analytical Balances, Carnivorous Plants, &c.

Refreshments in the Vestibule and the Deposit-room of the Library (Approached through the Front Portico).

In the Library Committee-room.—Microscopes.

In the Library Reading-room.—Drawing-room Vocal and Instrumental Music. Magneto-Electric Machines, Radiometers, Graphoscope, Cypriote Newspapers, &c.

The following Lectures, &c., have been delivered during the Session :—

(Pre-Sessional.)—Professor GRAHAM BELL, the inventor of the Telephone.—"Speech."

H. M. STANLEY, F.R.G.S.—"The Dark Continent; the Sources of the Nile; Around the great Lakes Victoria and Tanganika; down the Livingstone to the Atlantic Ocean."

ANTHONY TROLLOPE.—"The Native Races of South Africa."

Mr. and Mrs. W. H. KENDAL (Miss Madge Robertson).—"A Reading from Shakespeare and other Poets."

The Rev. Canon TRISTRAM, LL.D., M.A., F.R.S.—"Fish and Fisheries."

The Rev. HERMANN ADLER, M.A., Ph. D.—"The Wit and Wisdom of the Talmud."

W. F. BARRETT, F.R.S.E., F.C.S., Professor of Physics, Royal College of Science, Dublin ; Member of the Council of the Physical Society. &c. "Edison and some of his recent Inventions ; the Carbon Telephone ; the Phonograph ; the Tasimeter ; Electric Lighting, &c." (With experiments.)

The Ven. Archdeacon DENISON, M.A.—"The History of Philosophy."

Herr ERNST PAUER, of the Royal Institution.—"Bach and Handel." (With Illustrations on the Pianoforte.) "Beethoven and Schubert." (With Illustrations on the Pianoforte.)

The Rev. W. H. DALLINGER, M.A., F.R.M.S.—"Researches into the Origin and Development of Minute and Low forms of Life." (Illustrated by the Oxy-hydrogen Light.)

THOMAS BRASSEY, M.P., M.A., A.I.C.E.—"The Comparative Efficiency of English and Foreign Labour in its application to Maritime Enterprise."

The Rev. W. BOYD CARPENTER, M.A., Hulsean Lecturer at the University of Cambridge.—"Scenes and Sketches of the Court of Louis XIV."

BRET HARTE, U.S. Consul at Crefeld.—"The Argonauts of '49 : A Tale of Californian Life."

The Right Hon. E. H. KNATCHBULL-HUGESSEN, M.P., D.L.—"Oliver Cromwell."

W. H. PREECE, C.E., Electrician, General Post Office, London; V.P. Soc. Tel. Eng., &c.—"Recent Advances in Telegraphy." (With Practical Illustrations.)

W. SAUNDERS.—Lecture to the Working Classes on "The Organisation of Industry at Home and Abroad."

A. M. SULLIVAN, M.P.—"The House of Commons: Its History and Mechanism."

R. S. BALL, LL.D., F.R.S., the Astronomer-Royal of Ireland, Professor of Astronomy in the University of Dublin.—"The Recent Eclipse of the Sun." (Illustrated by the Oxy-hydrogen Light.)

GEO. J. ROMANES, M.A., F.L.S.—"The Scientific Evidences of Evolution."

The Rev. J. P. MAHAFFY, M.A., F.T.C.D., Professor of Ancient History in the University of Dublin; Knight of the Order of the Saviour in Greece, &c.—"Modern Greece and her Prospects."

H. C. SORBY, F.R.S., President of the Geological Society, &c.—"The Structure and Origin of Meteorites and Meteoric Iron." (Illustrated by the Oxy-hydrogen Light.)

G. B. LONGSTAFF, M.A., M.B., Cert. San. Sci. Oxon., M.R.C.P., Lond.—"Preventive Medicine."

Judge BEDWELL.—"Shakespeare's Sonnets."

The Right Honourable the Earl of DUNRAVEN, K.P.—"Sporting in Canada."

C. COPLAND, C.E.—"Artificial Lighting." (With experiments.)

Judge BEDWELL.—Lecture to the Working Classes on "The Microscope." (With Illustrations.)

The Council have to express the deep obligation of the members and the Town to the many eminent and representative persons who have so ably addressed the Society during the year, and especially to several who thus rendered honorary services.

Several of the Lectures delivered during this and the preceding Session have been, or will be published, including that of Mr L. Courtney, M.P., on "The Movement of Centres of Industrial Energy," which has since appeared in the *Fortnightly Review*; and those of Sir Edmund Beckett, Bart., Q.C., Professor W. F. Barrett, F.R.S.E., the Ven. Archdeacon Denison, M.A., Mr. Thomas Brassey, M.A., M.P., the Right Hon. E. L. Knatchbull-Hugessen, M.A., M.P., Mr. W. H. Preece, C.E., Mr. W. Saunders, Mr. A. M. Sullivan, M.P., Mr. Romanes, and Judge Bedwell.

The Right Rev. the Bishop of Manchester, Major Butler, C.B., and the Right Hon. Baron Dowse, were unfortunately prevented by illness or absence from England, from fulfilling their promises to lecture during this Session, and the Council were also disappointed in

the hope that Professor Huxley would be able to visit Hull for the same purpose in March.

The year has seen the formation of a Microscopical and also of a Geological Section, the former of which has been joined by 42 and the latter by 130 members, and (in conjunction with the Student's Association, formed in 1878, and now consisting of 120 members), both promise to prove successful, (by means of field excursions and otherwise), in promoting in the town and neighbourhood that practical and original scientific work which it should be a chief aim of the Society to develope.

The following are the officers of these Sections :—

MICROSCOPICAL SECTION.

President :—Dr. ROLLIT, F.R.A.S.

Vice-Presidents :—T. M. EVANS, M.R.C.S., and J. S. HARRISON, F.R.M.S.

Hon. Secretary and Treasurer :—R. H. PHILIP.

GEOLOGICAL SECTION.

Chairman :—Dr. ROLLIT, President H. L. and P. Society.

Hon. Secretary and Treasurer :—E. J. WILSON.

Hull has enjoyed the exceptional privilege of receiving a third course of "Science Lectures for the People," and it is most satisfactory to add that the liberality of the Gilchrist Trustees has been even more appreciated than last year by the Artisan Classes of the Town (for whom these Lectures are more especially intended), between 3,000 and 4,000 having paid the admission fee of one penny.

The following was the Syllabus of these Lectures :—

Dr. CARPENTER, C.B., F.R.S., F.L.S., Corresponding Member of the Institute of France.—"The Voyage of the Challenger: Physical Geography of the Deep Sea."

Professor P. M. DUNCAN, M.D., F.R.S., late President of the Geological Society.—"The Age of Reptiles."

Mr. R. A. PROCTOR, B.A., F.R.A.S.—*"The Stars."

Dr. CARPENTER.—*"The Voyage of the Challenger: The Animal Life of the Deep Sea."

Mr. PROCTOR.—*"The Genesis of the Solar System."

Professor W. C. WILLIAMSON, F.R.S., Owen's College, Manchester.—"Vegetable Nutrition and Insectivorous Plants."

The Lectures marked * were illustrated by the Oxy-hydrogen Lantern.

At the concluding Lecture the annexed resolution was moved by Mr Billany, shipwright, seconded by Mr. Arthur, currier, and carried with great acclamation :—

That the Working Classes of Hull hereby tender their heartiest thanks to the Gilchrist Trustees and Dr. Carpenter for the third course of Science Lectures for the People ; and they also thank, equally heartily, the President and Council of the Literary and Philosophical Society for their action in the matter, and for the many educational advantages now so freely offered to all classes in the town.

The Lecture Hall has been very crowded at these Lectures, and the Council thank the Trustees and Dr. Carpenter for the readiness with which they responded to the President's urgent appeal to them to continue, under the auspices of the Society, the great intellectual, moral, and social work which these Lectures have been the means of achieving in Hull ; a work which ought to be continued in the future by local or other Lecturers if (as is probable), further aid cannot be obtained from the Trustees. It may, however, be possible to procure a grant from the Trust in aid of a systematic course of scientific instruction by means of Penny Lecturers for the Working Classes, and it would appear very desirable to effect this object, if practicable, by obtaining assistance from local or other near sources ; as from the Yorkshire College at Leeds.

That a real demand exists for cheap instruction and intellectual entertainment of a high class is shown by the fact that the Saturday Afternoon Lectures and an Open Museum have attracted larger numbers than ever ; indeed, on several occasions the size of the Lecture Hall has been quite inadequate for the admission of all who have desired to enter. The receipts, too, from this source have risen to no less than £120 1s. 4d. (including donations amounting to £6 6s.) ; while nearly 30,000 persons have been admitted on payment of a penny each.

The Institution is greatly indebted to the following gentlemen who have rendered help during the year in this department of the Institution, a list which includes the name of a distinguished stranger, J. MacGregor, Esq., author of "The Rob Roy on the Jordan," &c. :—The President, Dr. Rollit, (2), Messrs. J. P. Nash, M.A. (3), C. Judge (3), Rev. J. Mc.Cormick, M.A., Rev. J. R. Boyle (3), Lieutenant Armit, R.N., Messrs. Fullam, J. L. Jacobs, M. B.

Spurr (4), C. H. Hunt and Mrs. Hunt, B. Batigan (2), Briggs Carlill, Dr. Gibson (3), Rev. A. B. Carpenter, M.A., (2), W. Stephenson, Evan Fraser, Rev. C. M. Pym, M.A., Rev. J. A. Macdonald, M.A., J. C. Niven, W. B. Thomas (2), Dr. Pyburn, Miss Martin, A. Simpson, Rev. J. E. Symes, M.A., (3), J. J. H. Teall, M.A., F.G.S., Thomas Harrison (2), J. H. McClure, T. M. Evans, Herr Müller, Mus. Bac. Oxon., Rev. L. W. Heath, M.A., H. Rose, Rev. F. B. King, M.A., C. S. Todd, F.S.A., J. B. Power, J. MacGregor, M.A., Mrs. Wilson Barrett, E. Bannister, R. Starr, M.A.C., J. S. Harrison, Jno. Cook. A.A.

The Science and other Classes have been attended by a considerably increased number of Students, viz., 210, as compared with 148 in the previous year. Of these 110 will present themselves for examination this month (May); while at the commencement of the the Session 34 received, at the hands of the Sheriff, Queen's Prizes (being an increase of 7), and 50 obtained certificates, as the rewards of success at the examination in 1878.

The following is a list of the Classes and their Teachers :—

Subject.	Teachers.
Physiography	W. H. Colborne Carter.
Machine Construction	Alfred Simpson, M.I.M.E.
Steam	Ditto.
Building Construction	John Ward.
Practical Geometry	G. W. M. Sansom and A. Menzies.
Pure Mathematics	John Read, Gold Medallist.
Magnetism and Electricity	Ditto.
Inorganic Chemistry	J. Baynes, Jun., F.C.S., Borough Analyst, and W. G. Christie.
Botany	J. C. Niven, Curator Hull Botanic Gardens.
Botany for Ladies	Ditto.
Geology	J. J. Harris Teal, M.A., F.G.S.
Public Reading	C. Judge, Jun.
Practical Telegraphy	Thomas Harrison, A.I.T.E.
Technical Arithmetic	Alfred Simpson, M.I.M.L.

Of these the Public Reading Class has been formed this Session; it has been attended chiefly by Artisans, and the Society owes many thanks to the honorary Teacher, Mr. C. Judge, for conducting it, and for thus promoting the study of reading with a view to the improvement of the recreations, and the refinement of the homes, of the working-classes.

The Class for Practical Telegraphy has also been newly formed, and, under the direction of Mr. T. Harrison, A.I.T.E., of the Postal Telegraphs, and subject to an examination which W. H. Preece, Esq., (V.P. Inst. Tel. Engineers) has very kindly undertaken to conduct, appears likely to fulfil a very useful, intellectual, and industrial office in the town ; and to the above gentlemen and to Mr. Alfred Simpson, M.I.M.E., who has conducted a class in Technical Arithmetic (which is intended to give a general introduction to the classes in applied science), the Society owes many thanks for the work they have thus cheerfully imposed upon themselves.

Additional Class-rooms and a Laboratory having been provided during the year, the Council repeat their opinion that the utmost facility should be afforded for the development of this Branch of the Society's operations, and they hope that the attention to be given to this department of the Institution, and to the University Extension Movement, during the next few years, will result in the localisation of systematic instruction of the highest class in Hull as a centre, and in the Institute as its natural home ; and that the latter will, as early as possible, be affiliated to one of the Universities, so as to obtain for those Hull students who may have only limited means, or whose time must be devoted early to business, some very considerable remission of the requirement of residence.

During the year the Society has added to its property and enlarged the scope of its operations by purchasing the adjacent house, No. 2, Albion-street, for the use of the School of Art, and by the erection of a Chemical and Physical Laboratory. On the completion of the latter, which has been fitted up with every modern appliance, and which will supply a great educational and scientific want in the town, it was surveyed by the Inspector of the Science and Art Department, who pronounced it one of the best and most complete in England.

The Council have now under consideration the appointment of a permanent Teacher of Chemistry and Experimental Physics, and they think that the offer of the use of such a Laboratory should be sufficient to induce a thoroughly qualified Analytical Chemist to accept the position. Communications have therefore been opened with the

object of securing the services of such a man, and the Council have every reason to regard hopefully the prospect of establishing a permanent School of Chemistry worthy of the size and importance of the town, a School in which not merely elementary teaching but advanced work, and even original investigation, may before long be carried on.

The School of Art, (in favour of which the Society has thought it right to discontinue its Art Classes), has also been supplied with every structural requirement to adopt it to its purpose, and it is the hope of the Council that the two Institutions will in future be closely related and marked by the same prosperity and public usefulness.

In the supervision of the above and other improvements, the Works Committee, and especially Messrs. Copland and Dibb, have rendered valuable assistance to the Institution, and the Council feel that the thanks of the members are eminently due to them and to the Architect, Mr. B. S. Jacobs.

It is satisfactory to be able to state that the cost of the property in Albion-street, of its adaptation to the purposes of the School of Art, and of the erection and furnishing of the Laboratory, in all about £2,396 17s. 7d., has been in a great measure defrayed out of the surplus income of the Society during the past three years, only £1,103 1s. 3d. remaining due in respect of the purchase and for construction, after taking into account the surplus income and the following subscriptions, which have been paid or promised to the new buildings fund :—

LIST OF SUBSCRIBERS TO SCHOOL OF ART AND LABORATORY FUND, 1879.

	£	s.	d.
Charles Copland	105	0	0
T. W. Dibb	105	0	0
Miss Craven	100	0	0
H. S. Blundell	30	0	0
A. K. Rollit	26	5	0
The Sheriff (R. M. Craven)	15	15	0
Dr. Gibson	15	15	0
Thomas Reynoldson	15	15	0
Joseph Dalton	15	15	0
W. D. Keyworth	5	5	0
W. D. Keyworth, Jun.	5	5	0
J. L. Jacobs	5	5	0
B. Carlill	5	5	0
C. S. Wake	5	5	0
G. Bohn	5	5	0
W. Hanwell	5	5	0
R. H. Barker	5	5	0
W. Hunt	5	5	0
T. A. Smithson	5	5	0
The Mayor (R. Waller)	5	5	0
J. P. Beaumont	5	5	0
Captain Krüger	5	5	0
Rev. L. W. Heath	5	5	0
J. H. Hill	5	5	0
R. H. B. Nicholson	3	3	0
Z. Scaping	3	3	0
E. H. Garbett	1	1	0
Mrs. Dobson	1	1	0
Mrs. B. B. Wright	1	1	0
S. Rimington	1	1	0
	£518	10	0

The Institution is thus improved in its additional rooms and appliances and in the value of its property, the study of Art has been materially aided at a critical moment, and by the acquisition of one of the adjoining houses the Society has made the first step in the enlargement of its frontage and in the absorption of premises which must ultimately be essential to the proper working of the Institution.

In the work of University Teaching the Society has taken part by the presentation of a memorial to the Crown, in favour of some general recognition of local institutions as centres of study, in preference to the creation of a new University in Manchester, and by the attendance of the President with a deputation to the President of the Council in support of the same object,—a movement which promises to result in the early foundation of the "Victoria University."

The Cambridge University Extension Lectures and Classes have also been successfully continued by the Resident University Lecturer and Teacher, the Rev. J. E. Symes, M.A., of Downing College, and J. J. H. Teall, Esq., M.A., F.G.S., Fellow of St. John's, who have delivered and conducted Lectures and Classes for the systematic study of Sound and Light (illustrated by most elaborate experiments), Palæontology, History (the Puritan Revolution and the Whig Revolution), English Literature (Shakespeare), and (for senior and junior Pupil Teachers) English History. (See Appendix).

The thanks of the Society are again due to the Artisans' Prizes Committee for having given prizes to the Pupil Teacher Classes, an incentive which has been highly valued by the University Teacher.

The Session has also been marked by a successful Soirée, given by the Students' Association, in the Royal Institution, on January 23rd, when the following was the programme :—

PROGRAMME.

Opening Address in the Museum by the President of the Association.
Vocal and Instrumental Music, and Exhibition of Scientific Apparatus and Experiments at intervals.
Music.
Scientific Apparatus.
The Phonograph, exhibited in the Council-room by the President of the Royal Institution (Dr. Rollit).
The Electric Light, exhibited by Mr. J. J. Harris Teall, M.A., in the Museum.

The new Carbon Telephone, and various other Scientific Instruments and Phenomena, will be shown and demonstrated by Dr. Rollit and Mr. Teall.
In the Lecture Hall a representation of the Comedy "Meg's Diversion," by Members of the Association and other Amateurs.

The Museum, (which has received many valuable presentations during the year, a list of which is appended), has been visited by large numbers, especially on Saturday afternoons when, and on bank holidays, it has been open to the public at a charge of a penny.

The arrangement, naming, and cataloguing of the Museum is however, the Council must repeat, far from perfect, or even proper for the educational purposes for which it is now so frequently used, and they would urge attention to this subject on the part of their successors and the Honorary Curators.

It would also be desirable to arrange and catalogue the Library, (a list of the donations to which is annexed), and to increase it as far as possible by the addition of scientific works and text books for the use of students, especially books of reference and the transactions of additional English and foreign learned societies, which can generally be obtained as free contributions.

During the year a Loan Art Collection, aided by the Science and Art Department, South Kensington ; by the Patron of the Society, H.R.H. the Prince of Wales; the Vice-patrons, Lords Ripon, Wenlock, and Londesborough ; and others, was opened in the Museum and attracted numerous visitors. Pecuniarily, it involved a small loss to the Society, and thus exceptionally decreased the income of the year, but the Council feel that the work deserved, and in a great measure obtained, success, and the thanks of the Society are eminently due to the Sub-committee who carried out the arrangements—Messrs. J. L. Jacobs (Hon. Secretary and Treasurer), W. Hunt, and Dr. Pyburn.

The Society have again to thank the Donors to the Museum, the Sheriff (Mr. R. M. Craven) for the continuance of a donation of £5 5s. per annum to the Saturday Afternoon Fund, and the local Press for the very generous support it has at all times given to the work of the Institution—an Institution whose uninterrupted progress is the one return desired by the Council, and a result which cannot fail to be gratifying to the Members and to the Town.

The President having read the Report of the Council,

The Rev. L. W. Heath, MA., moved, and Mr. Henry Simpson seconded, the adoption of the Report, which was carried unanimously.

The adoption of the Treasurer's Report was also carried on the motion of Alderman Willows, seconded by the Rev. A. B. Carpenter.

Mr. Copland called attention to the inconveniences arising from the holding of the Annual Meeting immediately on the termination of the Session, and moved an alteration in Law 17, in terms of which he had given notice.

Dr. Gibson seconded Mr. Copland's proposal.

Dr. King proposed an alteration, and a second amendment was proposed by Mr. Godfrey.

After some discussion it was ultimately resolved, "That the last meeting of each Session, which shall be considered the anniversary of the Society, shall be held at eight o'clock on an evening during the month of May which shall be fixed by the Council, of which meeting at least eight days' notice shall be given to all the members," and that law 17 be altered accordingly.

Dr. King then called attention to the exceptional services rendered to the Society by the retiring President (Dr. Rollit), and to the great development of the Society under his administration, and he moved that the Society testify its obligation by a special vote of thanks.

The motion was seconded by Dr. Gibson in very laudatory terms, and was carried by acclamation.

Messrs. Nicholson, Starr, Wood, and Bohn, were appointed Scrutators, and the election of officers was then proceeded with, the following being appointed :—

President :—R. M. Craven.

Vice-Presidents :—W. T. Dibb and J. H. Gibson, M.D.

Treasurer :—C. Copland.

Hon. Secretaries :—T. M. Evans and Briggs Carlill.

Council :

J. L. Jacobs.
W. Hunt.
Z. C. Scaping.
A. Macmillan.
T. Walton.
R. H. B. Nicholson.
C. S. Wake.
Dr. Bell.
Rev. A. B. Carpenter.
Dr. Elliott.
Dr. Pyburn.
C. R. Lambert.

The retiring President proposed that in consideration of the extra-services of the Sub-Curator during the past year, and of the additional demands on his time in connection with the Art Collection, a grant of £10 be made to him, together with the thanks of the Society. The motion was seconded by Mr. Jacobs, and carried unanimously.

Votes of thanks were also passed to the Saturday Afternoon Lecturers, to the Donors towards the School of Art Fund, to the Donors to the Museum, to the Press, to the Scrutators, and to the Honorary Officers of the Society.

APPENDIX.

THIRD ANNUAL REPORT

OF THE

University Extension Sub-Committee.

THE University Extension Scheme has now completed its third year of existence in Hull, and the second year since the continuous scheme of study designed by the University Syndicate was adopted. The Lectures and Classes during the preceding winter have included morning courses on Science and evening courses on History, with advanced classes both day and evening and additional classes for Pupil Teachers.

Mr. J. J. H. Teall, M.A., F.G.S., Fellow of St. John's College, has delivered an afternoon course of 24 Lectures on Sound and Light (illustrated throughout by experiments), with accompanying class, extending over both terms. The limited attendance at this course has been discouraging, and leads your Committee to the conclusion that Science subjects are not likely to command a sufficiently numerous attendance in the afternoon, and that, if the scheme should be persevered in, it will be found desirable to limit the Physical Science courses to the evening, when larger audiences may be expected. The Afternoon advanced class in Literature has been conducted by the Rev. J. E. Symes, M.A., Downing Coll., who was again appointed resident lecturer, and who in that capacity has done so much to give the scheme coherence and vitality. The subject taken for this class was Shakespeare, the Michaelmas Term being devoted to a minute analysis of four typical plays, and the Lent Term to a general review and criticism of the whole series of plays. The attendance has been satisfactory, and the paper work, though limited in quantity, has indicated considerable study and thought in the case of several of the students.

The evening advanced class in Science has been intended specially for the students who attended Mr. Teall's Geology course of the previous year. Upwards of seventy students joined the class on

Palæontology, which extended over the six months, and, though there was a falling off in numbers during the first term, that was only to be expected from the advanced nature of the work. The class has pursued a systematic study of organic fossil remains, specially of the lower forms of life, aided by the help of specimens, &c., and the students will now be prepared to do some practical work in the investigation of the Geology of their own district, which work, it is hoped, may be begun with the end of the present term. This class, it may be mentioned, was organised as a Science Class under the Science and Art Department, and a number of the students intend to present themselves for examination in May. The Government Grant from their success may be expected to reach £30, if it does not exceed that sum ; and as future Science Classes may be similarly organised, a constant source of income may thus be opened to aid the funds of the scheme.

The evening History subjects have been comprised in two courses on the Puritan Revolution and the Restoration and Revolution of 1688, delivered by the Rev. J. E. Symes, the resident lecturer. The attendance at these, though not very numerous, has been satisfactory in that the great majority have been working students, and have attended both lecture and class.

The Pupil Teachers' Classes in English History have been continued by the resident lecturer, but under less favourable conditions than last year. The School Board has found it necessary (owing to doubts as to the legality of the grant) to discontinue payment of the fees of their teachers, and their action has been followed by many of the Voluntary School managers. This step might be expected to have a serious effect in diminishing the numbers of the classes, and it is therefore satisfactory to be able to record that 118 Pupil Teachers joined the classes, nearly all paying their own fees. A better proof of the genuine interest awakened in these classes and of the good they have done could not be afforded, and the Committee think that, if nothing else had been accomplished by the University Extension movement in Hull, this work alone would establish such a claim on the support of those in the town who appreciate the importance of educational progress, as to ensure its continuance.

The Committee again acknowledge with pleasure the offer by the Artisans' Prize Committee of seven prizes of books at the Pupil Teachers' Examination in each term.

In the autumn of last year the Committee, finding that steps were being taken by the towns of Nottingham and Sheffield to bring before the University authorities the subject of affiliated colleges, memorialised the Vice-Chancellor in favour of some scheme which would give to local students the advantages of a shortened term of residence, or the reward of a local degree, or other public recognition of attainments. The University appointed a syndicate to consider the matter, and that syndicate has now reported in favour of allowing students at local affiliated centres to graduate after a shortened term of residence. This concession is evidently of great value, and if adopted will tend to give a new impetus to the University Extension movement, and, the Committee believe, to increase the number of Students. Another suggestion made by the Secretary has been adopted by the University authorities, one, namely, for the publication of a Calendar (similar to the University Calendar) for the local lectures throughout England. Such a publication will serve to give additional coherence and importance to the educational efforts of local entries, and increased dignity and value to the results of the work of the local Students.

During the present term a request was received from Scarboro' for a course of Lectures to be delivered by one of the Hull Lecturers. The arrangements were then too far advanced to admit of this being done at the time, but it is hoped that if the scheme is persevered with, arrangements may be made by which Scarboro' may be included in the scheme as an offshoot of Hull.

The Students' Association, the origin of which was described in the Second Annual Report, has received an accession of Members during the year, and now numbers upwards of 120. At the beginning of this year the Members displayed a degree of energy and interest in the movement in undertaking the sale of tickets, which had a beneficial effect on the numbers who were induced to join the course. At the beginning of the second term the Students' Association gave a Soirée, to which were invited the Members and their friends, the Committee and guarantors, and others who had shown an active interest in University

Extension. This Soirée it was hoped would have had a corresponding effect on the attendance at the Lectures of the second term, and would obviate the necessity of any personal canvass, but this was not found to be the case. The Soirée has, however, without doubt had its effect in making the scheme more generally known, and in establishing a claim on the sympathy of the public, the effect of which may be expected to be felt in future years.

The following table exhibits a summary of the numbers attending the various classes since the beginning of the movement :—

1876—77.
Morning Courses, 193 ; Evening Courses, 287 .....Total, 480

1877—78.
Morning Courses, 137 ; Evening Courses, 295 ; Pupil Teachers, 345..Total, 777

1878—79.
Morning Courses, 166 ; Evening Courses, 300 ; Pupil Teachers, 190..Total, 656

In comparing these numbers it should be observed that at the first commencement of the Lectures many purchased tickets who did not subsequently attend, and the total for that year therefore considerably over-estimates the number of actual Students. Further, it should be remembered that the great difference between the numbers of Pupil Teachers in the second and third years is caused by the change in the payment of fees before referred to. When these allowances are made, the figures appear to show a decided progress. A comparison made in last Michaelmas Term between the returns for Hull and Nottingham, in which place the scheme has been in operation for seven years, shews that at that time the number of Students at Hull (including Pupil Teachers) compared very favourably with the number of Students at Nottingham.

There is, however, great room for an increase in numbers, and the Committee desire to point out one direction in which they have not received the support which might fairly have been anticipated. In marked contrast with other towns where the scheme is in operation the schools of Hull have (with one or two gratifying exceptions) held aloof from the movement. In York, which may be quoted as an example, the Morning Courses are largely attended, and are made almost self-supporting by the private (girls) schools. In Nottingham some of the principal schools make it one of their features that their pupils have the opportunity of attending the University

Lectures. One of the chief results anticipated from the adoption of this movement was the influence it might be expected to exert in raising the standard of the local schools, and in enabling them to avail themselves of teaching advantages of a kind which they could not command singly. This expectation has not been realised, but it remains to be seen whether time will not convince the managers of local schools of the policy of supporting the movement, and the Committee hesitate to adopt the conclusion, which would involve a reproach on our local educational institutions, that they are in anywise reluctant to adapt themselves to modern requirements.

The financial statement is not yet complete, and the Committee propose to adjourn its consideration until the month of June when a supplementary report will be issued and circulated. Efforts are being made by members of the Students' Association to raise a fund sufficient to ensure the continuance of the work for a further period of three years, and the results of these efforts will be embodied in the same report so that the present position and the prospects of the movement may be dealt with as a whole. The estimated deficit on the three years will be covered by the guarantee fund raised at the beginning of the movement, but the Committee trust that the result of the appeal now being made will be such as to obviate the necessity for a call of the whole amount from the original guarantors, and such also as to furnish a satisfactory financial basis for the future prosecution of a work of such importance to the Society and to the town.

STATEMENT OF TICKETS SOLD.

CLASS.	TOTALS.	EX-AMINED.	PASSED.	1st Cl.
Sound and Light—First Term.				
Lecture and Class.....37 } Lecture only .....12 }	49	7	7	3
Second Term.				
Lecture and Class.....14 } Lectures only..... 6 }	20	7	6	4
Puritan Revolution—First Term	122			
Restoration and Revolution—Second Term	78	13	13	12
Palæontology	77	8	6	4
Shakespeare—First Term	62			
„ Second Term	39	8	8	5
Pupil Teachers—First Term	118	86	38	25* 13†
„ Second Term	73	52	28	17* 11†

* Board Schools. † Voluntary Schools.

Hull Literary and Philosophical Society.

SESSION 1878 - 1879.

PRE-SESSIONAL MEETING, October 8th, 1878.

The President (Dr. Rollit), in the Chair.

The Minutes of the last Sessional Meeting were read, and the following proposed as New Members of the Society :—Life Members —Judge Bedwell, Dr. Pyburn, Messrs. J. Tiffen and A. Wilson. Ordinary Members—Revs. J. R. Boyle, — Gilmore, Messrs. Chapman, Canby, Chilman, Dennis, Rev. J. M. Dixon, Alderman Chapman, Councillor Stirling, Captain Woollcombe, R.N., Captain Todd, Messrs. Foster, Goodman, B. Goodman, Hiort, Lambert, Logan, Murray, Ridgway, Dr. Kitching, Herr Kuntsmann, and Miss Oake.

Professor Graham Bell, the inventor of the Telephone, having been introduced by the President, delivered a lecture on "Speech."

In a very eloquent and lucid manner he directed atttention, first, to the formation of speech by the vocal organs ; next, to the condition of speech as it existed in the air ; and thirdly, to the mechanism of audition, or condition of speech as it existed in the ear.

The first attempt to solve the mysteries of speech was an endeavour to ascertain and catalogue the elementary sounds of all languages ; and in 1854 a Conference of Philologists was held in London for the purpose ; but it failed in consequence of the immense number of these elementary sounds that had to be distinguished. Attention was then given to the movements of the vocal organs, as observed by the laryngoscope, and by the ingenious method of coating the tongue with flour and gum, so that a pattern of the movements required to produce any sound was depicted upon it. The lecturer's father, Mr. Melville Bell, of Edinburgh, devoted great attention to the study of the organic formation of speech, and even catalogued in a very exact manner all the elementary sounds of the familiar

languages, as well as the inarticulate sounds which do not occur as elements of speech. It thus became obvious that certain positions of the vocal organs would yield certain sounds, but the why and wherefore received no explanation.

To the researches of Professor Helmholtz were due the great advances in acoustics that had been made during the last few years. He first discovered the nature of timbre or the quality of sound, though it had been previously known that pitch depended upon the rapidity, and loudness upon the extent or amplitude of vibrations. He showed that a pure musical tone was almost unknown, what we heard was a musical chord, or compound musical tone, the different notes of which were the result of sympathetic vibration. The Lecturer gave familiar examples of sympathetic vibrations, and showed that not only solids but liquids and gases were affected in the same manner. As a child's swing is set in motion by a succession of pushes, or impulses, given at the right moment, so one body in a state of vibration communicates its motions to other bodies, capable of vibrating at the same rate, by means of the impulses or waves of vibration transmitted through the intervening air. Every cavity containing air has a certain rate of vibration or resonance, the pitch of which depends upon the size of the cavity and of its external orifice; and the Lecturer demonstrated in his own person the resonance of the cavities of the mouth and of the larynx, and the variations in the pitch produced by alterations in their relative size.

Allusion was next made to the recent discovery of a number of delicate fibres in the fluid of the internal ear, which may be likened to the strings of a harp, and, being connected with filaments of the auditory nerve, are able to make the brain cognisant of their vibrations.

Professor Bell proceeded to explain how several musical tones can co-exist in the air at the same time, and to show the complex form of the sound wave. The fact that each sound has its own peculiar form of vibration rendered possible the invention of the telephone, phonograph, and microphone, which are instruments for transmitting, recording and repeating, and magnifying these vibrations.

The President noticed the eloquence and simplicity with which the Lecturer had dealt with a very abstruse subject, and a vote of thanks was accorded him on the motion of the Sheriff, seconded by Dr. King, and supported by Sir H. Cooper and the Postmaster.

THE PRESIDENT'S CONVERSAZIONE, NOVEMBER 5TH, 1878.

The winter session of the Society was opened by a Conversazione at the Royal Institution, given by the President and Mrs. A. K. Rollit. The occasion is one which will long be remembered in the annals of the Society, and in every respect the conversazione was a brilliant success. The immense character of the gathering, the completeness of the arrangements, and the novelty of many of the experiments performed for the amusement and instruction of the assembly (illustrating the latest developments of the sciences of electricity and sound by means of the electric light, the phonograph, and the microphone) stamped the conversazione as one of the most enjoyable scientific evenings spent in Hull. About a thousand persons were present, invitations having been sent to the whole of the members. The entrance was from Waltham-street, and the whole suite of rooms of the Royal Institution was thrown open, the Library premises having been kindly lent for the occasion by the committee of that Institution. In the Museum and Art Gallery, which were illuminated by the Oxy-Hydrogen Light, there was Instrumental Music by members of the Arion Band, and there were also the following historic scientific apparatus, specially lent from South Kensington :—Tycho Brahe's astronomical quadrant, A.D., 1546 ; Otto Von Guericke's air pump, A.D., 1602 ; Magdeburg hemispheres, A.D., 1602. There was also in these rooms a large collection of the most recent Telegraphic Instruments, the newest forms of Telephones, Electro-Magnetic Engines in work, and Analytical Balances, and Carnivorous Plants, and experiments in Vortex Motion were also shown, &c. The portico in front of the Institution had been cased in with canvass, and was elegantly decorated and illuminated with the Oxy-Hydrogen Light,

Chinese Lanterns, &c. This was the approach to the Vestibule of the Library where, and in the Deposit Room, Refreshments were served during the evening. In the committee-room of the Library there was a large collection of binocular and other Microscopes, arranged by Mr. Evans, and living and other interesting microscopic objects were shown. The Reading-room of the library was furnished as a drawing-room, and during the evening chamber vocal and instrumental music was performed by Mrs. C. H. Hunt, Miss Martin, A.R.A., Mr. Russell Starr, M.A.C., Mr. C. H. Hunt, Mr. C. R. Moxon, Mr. Hudson, Mus. Bac. Oxon., Mr. Holder, &c. In this room there were also Radiometers, Magneto-electric machines, Graphoscopes, Photographs, and other objects of interest and curiosity. In the Lecture-hall, at 8-30 and 9-30, the President showed and explained the Phonograph, the Microphone, the Telephone, the Phoneidoscope, and other Instruments, and performed Electrical and other Experiments, including experiments with Apps' large Induction Coil, which gave a 20-inch spark in air; the electrical discharge through large Giessler's Tubes containing different gases; Gassiot's Cascade; the Electric Safety and Divers's Lamp; the electric Time Ball; experiments with Sensitive Flames, and Galton's whistle for ascertaining the limit of audible sounds, &c. He also exhibited the Electric Light by means of a battery of 60 Grove's cells, and the Serrin automatic lamp, which is the one used at the lighthouses on the North Foreland and other places. The light was extremely brilliant, and was at times subdued by a screen of opaline glass, and magnified by a dioptric lense, as in lighthouse illumination. The method of illumination by the Jablochkoff Electric Candle, as used in Paris, one of which was shown, was explained. The contrast was also shown between the electric light and the Magnesium Lamp, the latter of which burnt very brilliantly. The electric and other experiments were most attractive and successful, and the entertainment, which was of the most varied description, did not conclude until long after midnight, dancing being kept up to the strains of the Arion Band.

MEETING, NOVEMBER 12TH, 1878.

R. M. Craven, Esq., Vice-President, in the Chair.

H. M. Stanley, F.R.G.S., the African Explorer, delivered a Lecture on "The Dark Continent."

Having first described the island of Zanzibar, where his expedition was organised, and where there were many English residents, he gave particulars of his arrangements. The party consisted of 356 persons, including 315 porters and baggage guards, 37 women and boys, and 4 Europeans; and they were well prepared to encounter three years of exploration in the unknown wilds of Africa. They took with them an abundance of cotton goods, coloured beads, and brass wire, to satisfy the customs' duties imposed by African chiefs on strangers, and to enable them to purchase food from the natives.

Starting in November, 1874, they crossed the mountains, and then traversed a miserable swampy country; next through dense forests till they reached the valley of Umbari, and met with a rustic, peaceful, and very hospitable people. Afterwards arriving at the Victoria Nyanza lake, they put together their cedar boat, which had been carried in sections through the jungle, and circumnavigated this great inland, fresh-water sea, confirming Capt. Speke's belief that it was one sheet of water. On landing, Mtesa, the Emperor of Uganda, received them with great ceremony and valuable presents. He appeared much interested in European civilisation and manners, and endeavoured to imitate the ways of the white man. He and his people were Mahommedans, but Stanley thought them well disposed to Christianity, and the Missionary Societies have since followed up his attempts at their conversion. One of the pages of King Mtesa accompanied Stanley in his further travels, and was present at the lecture; the king also furnished him with an escort of 2,000 warriors. The lecturer described his meeting with Miambo, the Warrior Chief, and the establishment of blood-brotherhood between them. Arriving at Ujiji, where he had first met Livingstone, he circumnavigated the lake Tanganyika, remarkable for its great depth, and the mystery connected with its outlet. His next task was the solution of the question whether the great river Lualaba was the Nile, as Livingstone thought, the Niger, or the Congo. To determine this they set out

from Ujiji in August, 1876, and after traversing dense and dark forests, where each individual had to proceed as best he might, and where most of his company forsook him, he proceeded down the river in his boat, the others journeying along the banks. In the descent of this river they encountered everywhere most warlike and inhospitable nations, addicted to cannibalism; and had in addition to contend with impassable cataracts, which frequently compelled him to carry the boat over land, and even over mountains, from which accidents were frequent. His last English companion, Pocock, here lost his life, being drowned in descending a cataract. The lecturer had the satisfaction of identifying this river with the Congo, or Livingstone as it is now called. In conclusion he described his meeting with whites once more at Embonma, on the West Coast, and his return voyage round by the Cape of Good Hope to Zanzibar with the few companions that remained after the dangers and desertions experienced in more than three years of travel.

A vote of thanks to the lecturer was proposed by the Chairman, and carried with acclamation.

MEETING, November 19th, 1878.

The President (Dr. Rollit), in the Chair.

Mr. Anthony Trollope, delivered a Lecture, on "The Native Races of South Africa."

After noticing the importance, both in extent of territory and population, of our South African Dependencies, the Lecturer proceeded to deprecate the state of mind in which the subject was too generally regarded by the public, as though it were merely a question of keeping down a number of troublesome barbarous tribes, who would ultimately become extinct. As a fact, the South Africans were an exception to the general rule of the extinction of subject races in the presence of the European. They had increased both in numbers and in prosperity under British rule. In Cape Colony the Hottentots had amalgamated with the descendants of the Boers, and the physical characteristics of the old tribes could be traced in the present hardy, industrious, agricultural population.

Speaking of the Kaffirs, the Lecturer defended the conduct of the British Government in the six wars which had taken place, on the ground that the wars had been necessary to maintain our position, and the only alternative would have been to leave the country. We had now succeeded in living peaceably with the Kaffirs, they had taken to agriculture, and he predicted a prosperous future for them.

The same prediction might be made with reference to the Zulus, of Natal, an intelligent race, with whom we had established a complete harmony.

Coming West to the Transvaal, the Lecturer gave an outline of the series of events which had led to its annexation. The dispute as to the Northern and Western frontiers which had been the cause of the troubles with the former Dutch occupiers was still unsettled, and war was now impending with the chief of the adjoining tribe and his ally Cetewayo.

The Lecturer gave a description of the Diamond Fields, and spoke of the trade as having created habits of industry amongst the natives, 10,000 of whom were in regular employment at the central settlement. He expressed, finally, his decided opinion that taking our action in South Africa as a whole, we had done our duty to the natives, and the natives recognised the fact.

A vote of thanks was carried on the motion of Mr. Dibb, seconded by Mr. Barrett.

MEETING, December 4th, 1878.

The President (Dr. Rollit), in the Chair.

Mr. and Mrs. W. H. Kendal (Miss Madge Robertson) having offered to give a complimentary Reading in aid of the funds of this Society, the Public Rooms were engaged, and were completely filled by the members and their friends, whereby they were enabled to hand over nearly sixty pounds to the Treasurer.

The programme comprised a short Comedy entitled "The Happy Pair," played by Mr. and Mrs. Kendal; part of the Forest

Scene from "As you like it," in which the characters of Rosalind and Orlando were pourtrayed ; and a scene from "The Hunchback" of Sheridan Knowles.

The intelligent and vivacious manner in which the pieces were rendered made a great impression on the audience, who, from previous acquaintance with these gifted artists, were prepared to expect an intellectual pleasure of the highest order.

Miss Pattison, a friend of Mrs. Kendal, also recited two selections from the writings of Bret Harte with much expression and pathos.

At the conclusion, the President spoke of the services rendered to this Society on former occasions, as well as now, by Mr. and Mrs. Kendal, and proposed "That they be elected Honorary Members of the Society in recognition of their frequent and eminent services to the Institution and to the Town."

This proposal was seconded by the Sheriff, R. M. Craven, Esq., and carried with great acclamation.

Mrs. Kendal, in returning thanks, alluded to her former connexion with Hull at the outset of her career, and to the kindness and appreciation with which her endeavours to please had always been reciprocated.

MEETING, December 10th, 1878.

The President (Dr. Rollit), in the Chair.

The Minutes of the last meeting having been read, the following were proposed as Members of the Society :—Life Member, Mr. T. M. Evans ; Ordinary Members, Messrs. J. G. Wallis, W. Willingham, P. C. Whitfield, J. P. Shepherd, W. A. Shaw, R. H. Winter, Jas. Partington, C. B. Hayes, S. Dearman, S. Holmes, J. Baggs, Wm. Johnston, Chas. Hillyer, Captain T. Martin, Mrs. E. N. Marsdin, and Miss Annie Varley.

The President introduced the Rev. Canon Tristram, LL.D., F.R.S., who delivered a Lecture on "Fish and Fisheries."

Having alluded to the enormous reproductive power of fishes, the Lecturer spoke of their natural enemies, and first those of their own element, the finner whale, cod, coal fish, and dog fish, the

porpoise and seal; then those of the air,—the gannet, gulls, guillemot, rasorbill, and other birds. All those enemies, however, he believed to be incapable of disturbing the natural balance. Man is the great disturber, and unless some restrictions were placed upon fishing irreparable injury would result.

Fishing is probably the oldest of the arts of man, and fish catching with guile, as with the hook, is an art practised by the lowest savages.

Fish are found in abundance only in comparatively shallow waters, and in the deep ocean are very scarce. The British Islands, standing upon an immense shallow bank, or platform, which extends fifty miles beyond the west coast of Ireland, and eastward as far the Dogger Bank, are most bountifully supplied with fish; and this platform is the great fishing ground of Europe, as the similar one upon which Newfoundland stands is the fishing ground of America.

The English, he said, have been treating their fisheries as hunting grounds, like the savage Mohawk, instead of cultivating them as farms. The Chinese for thousands of years have protected and bred their fish, as also did the monks of mediæval England, and we must learn to do the same. The amount of food for man which the sea will produce is enormous; the shallow waters having been estimated to yield twelve times as much per acre as the same amount of land; and fish is a very wholesome diet, our seafaring people being the most stalwart race in the country. Land animals cannot be much increased in numbers, but fish food is capable of an almost unlimited production, a fact of the utmost importance to our rapidly increasing population.

To attain this result the fish must be undisturbed in spawning time. It is then that they come up to the shallower waters, and are taken in immense numbers, and their spawn also destroyed by the steam trawl. Steam trawling ought therefore to be abolished in territorial waters, and confined to the deep sea fisheries, where it cannot do the same amount of injury.

After some remarks by the President, a vote of thanks was accorded to the Lecturer on the motion of Mr. Copland, seconded by Mr. Evans, and supported by Mr. Stratten.

MEETING, DECEMBER 17TH, 1878.

The President (Dr. Rollit), in the Chair.

The Secretary read the minutes of the previous meeting, and Messrs. G. T. Clayton and W. H. Lawrence were proposed as new members of the Society.

The Rev. Dr. Adler then delivered a Lecture entitled "The Wit and Wisdom of the Talmud."

The Talmud, the Lecturer said, was almost a sealed book to Englishmen, consisting as it does of 12 folio volumes of 6,000 pages, and written in the Hebrew tongue, but the article of Dr. Deutsh in the *Quarterly Review* had excited much interest in it. Talmud signifies learning, and the work is a kind of Encyclopedia, treating of everything known in those days. It contains the statutes of the Israelites; the debates of the schools on the reasons for the various precepts and rules of action, and the scientific knowledge of the period. Thus in astronomy, for example, the Lecturer showed that the periodical returns of Halle's comet were known and predicted. Zoology, botany, anatomy, and medicine were carefully studied, and natural phenomena closely observed; even the facts of Darwinism were recognised, and the use of anasthetics in surgery not unknown. The ethics of the Talmud are not a regular system, but certain maxims handed down from previous ages. In these the Deity is set up as the highest excellence, and the whole duty of man is to imitate his exalted nature. Many of their maxims were quoted by the Lecturer, and were remarkable for their liberal and philosophical spirit. Man was to be judged not according to his belief, but by his actions, and the rule of action inculcated is this "Thou shalt love thy neighbour as thyself."

The Talmud says "This is the gate of the Lord into which the righteous shall enter,"—that is the pious of all the nations of the earth, whether Jew or Gentile. Such maxims contain not only the wisdom of the head, but the goodness of the heart, and therefore embrace all mankind. Instead of despising manual labour, the Talmud says "Work is great, for it honoureth him who is engaged in it." Again, "There is the crown of learning, the crown of priesthood, and the crown of Royalty, but the crown of a good name excels them all."

The writings of the Talmud were generally considered to be austere and puritanical, but they were really full of wit, and the Lecturer concluded by quoting many amusing illustrations of this feature.

The President remarked that as the Jewish books were almost unknown to us, he had been fortunate in prevailing upon Mr. Jacobs to bring Dr. Adler before the Society. A vote of thanks was moved by Sir H. Cooper, seconded by Mr. Jacobs, and supported by Mr. Benas, of Liverpool.

MEETING, JANUARY 2ND, 1879.

The President (Dr. Rollit), in the Chair.

The Minutes of the last meeting having been read by the Hon. Secretary, the President introduced Professor Barrett, of the Royal College of Science, Dublin, who lectured on "Edison and some of his Recent Inventions," illustrating his remarks with numerous experiments.

Beginning with an outline of the life of Edison, he proceeded to notice his work, and first exhibited and described the Electric Pen, which, by means of a rotating electro-magnet, protrudes and withdraws a needle so rapidly as to make a series of punctures in the line traced by the pen. The Electro-Motograph was then described, and Quadruple Telegraphy explained. The Carbon Telephone was next exhibited, and its practical value demonstrated, the sounds emitted being distinctly audible throughout the Lecture Hall. The Tasimeter, an instrument for gauging minute variations of temperature, was also experimented with, and its extreme delicacy satisfactorily tested. A delicacy so marvellous that the instrument is sensitive to the heat which reaches us from the stars. The Phonograph again uttered its now familiar voice, and the Electric Light was exhibited, and its practical value insisted upon. In conclusion the Lecturer remarked upon the practical turn of mind of Edison, who is an inventor rather than a discoverer.

The President having spoken, Mr. Copland in moving a vote of thanks, dilated upon the comparative value and usefulness of the

electric and gas light, giving it as his opinion that the latter would always be in request for domestic purposes. Mr. M. Samuelson seconded the vote of thanks, which was carried by acclamation.

MEETING, JANUARY 14TH, 1879.

The President (Dr. Rollit), in the Chair.

Having proposed Dr. J. F. Nicholson as a member of the Society, the President introduced the Ven. Archdeacon Denison, who read an original paper entitled "Outlines of the History of Philosophy."

Beginning with an explanation of the term "Philosophy," due to Pythagoras, and its definition by Cicero as "Love for the pursuit of Wisdom," the Lecturer contended that the highest attainments had already been reached long ago, and that the present age is remarkable for its shallowness. The highest wisdom, he said, is to be content that there are things which are not for man to know.

At the present day there is a huge wave of doubt and scepticism directed against the philosophy of the Bible, resulting from the preference by the world of its own wisdom, and from the pride of life manifested in the Geological and other Scientific enquiries of the last fifty years. There is nothing which the sick man dreams which is so monstrous as not to find some philosopher to affirm it. Only one philosophy is necessarily paramount, viz., that of Revelation. In it all other philosophies, so far as they are true, are included; by it all other philosophies, so far as they are false, are cast out.

The Lecturer then explained the philosophy of Job, and showed how that, lacking absolute submission, God convinced him by appealing to the *reason* of his creature for the recognition of the *limits of reason* in relation to its Creator. A lesson very necessary for this age. Job is the chief exponent and chief example of this philosophy.

The philosophy of Socrates was then treated of, and the magnitude of the advance made by him, as the first to bring down philosophy from things hidden from man to human things. Before his time a benovolent, fatherly, Providence was not dreamt of; the Deity was a God of War.

The true and false philosophy of Milton's Comus were distinguished, the first being that of Socrates, the latter that of Epicenus and his disciples.

As the philosophy of Job is the highest amongst inspired writers, so that of Socrates is the highest amongst the uninspired.

At the conclusion the President proposed a vote of thanks, which was carried by acclamation.

MEETING, JANUARY 16TH, 1879.

The President (Dr. Rollit), in the Chair.

Herr Ernst Pauer, of the Royal Institution, delivered a lecture in the afternoon on Handel and Bach, and another in the evening on Beethoven, illustrating them on the pianoforte.

Beginning with a graphic sketch of the life of Handel, he proceeded to a critical examination of his works, which he described as occupying in music the place taken by the Epic or heroic song in poetry. As examples of his compositions for the Clavicord a Concerto in D Flat, the "Water Music," and the "Harmonious Blacksmith," were most effectively given upon the pianoforte.

The life and compositions of J. Sebastian Bach were then treated in the same manner, and his wonderful creative genius, as well as the remarkable completeness of his works noticed. Attention was drawn to the affinities existing between these two great musicians, both being born in the same country, in the same year, and dying at an advanced age after a life actively spent in devotion to the purest and loftiest forms of art. A Concerto on an Italian Model, two English Sonatas, and a Gavotte illustrated this portion of the lecture.

In the evening Beethoven's life and works were described at considerable length, and several of his best known Sonatas, given upon the piano with the greatest possible feeling and pathos, formed a delightful conclusion to his most interesting lecture.

On the motion of Mr. Carlill, seconded by Mr. Evans, a hearty vote of thanks was accorded him.

Dr. Marson was proposed as a Member of the Society.

MEETING, January 21st, 1879.

The President (Dr. Rollit) in the Chair.

The Rev. W. H. Dallinger delivered a Lecture on his "Researches into the development of minute and low forms of life."

After introductory remarks as to the extent to which Science was indebted for its progress to the perfection of modern instruments, the Rev. Lecturer described the improvements which had been made during the last few years in the microscope, especially in the manufacture of high power objectives. The highest power object glasses (such as 1-25th and 1-50th in the Lecturer's possession) were now made with as perfect definition as the low power glasses of a few years ago. At the same time the difficulty experienced in using the higher powers was such as to demand not only special training but special aptitude. The differences in delicacy of retina are considerable, and the Lecturer had found that only one person out of seventeen on an average was able to distinguish the excessively small flagellum of *Bacterium termo.*

The Lecturer proceeded to illustrate what was involved in the magnification of an object, especially insisting that its importance consisted not in enlarging details already visible, but in displaying fresh details, which would otherwise be entirely invisible. This was illustrated by a series of admirable drawings made by the Lecturer, and exhibited by the oxy-hydrogen microscope. One series exhibited *navicula rhomboides* magnified successively 600, 1,200, 1,800, and 2,400 diams, shewing clearly that certain details did not appear until the highest power was applied.

The Lecturer then proceeded to give an outline of his researches into the development of Bacteria. In conjunction with Dr. Drysdale, the Lecturer had studied the complete life history of *Bacterium termo,* the smallest of the group, a body so minute as to require experience even to detect it under the highest powers. He first attempted to arrive at a definite measurement of the dimensions. The ordinary micrometer was too coarse for the purpose, and he had therefore to resort to drawings made with the camera lucida shewing the body of the flagellum, which drawing was compared with the original and magnified, and the ratio between the diameter of the body and that of the

flagellum compared. Two hundred experiments were made, and the mean of the results gave the 1—240,000th of an inch as the diameter of the flagellum.

The Lecturer then referred to the importance of the results he and his colleague had arrived at on the general problem of the origin of life. Expressing himself as a warm believer in evolution, he referred to the general agreement of the most eminent evolutionists as supporting him in the conviction that it had not at present been proved that living matter was produced out of non-living matter. No doubt the doctrine of evolution would have received the most convincing support if Dr. Bastian had succeeded in establishing the existence of spontaneous generation, but on the other hand evolution was not imperilled if it could be shewn that spontaneous generation had now no existence. His own researches had convinced him of the universality of the rule that life proceeded only from life. Dr. Bastian had approached the question by studying the death point of monads, while the Lecturer and his colleague had studied the whole life history of certain forms with the object of discovering how they were propagated. In the course of four years' researches six different forms had been studied, and the complete life cycle of each determined, with the result that all were found to be propagated by germs from a parent form.

The Lecturer gave, as typical of his researches, a description of the life of the monad, its growth, its rapid change of form, its *amœboid* state leading to a gradual widening of the body and ultimate separation into two complete organisms, the fusion of two while in the amœboid state, and the formation of germs, each of which on being liberated became an independent being destined to go through the same metamorphosis. All these changes were illustrated by slides prepared by the Lecturer and shewn by the oxy-hydrogen microscope.

The Lecturer also described certain experiments which he had undertaken to test the accuracy of Dr. Bastian's researches. He had found that a temperature of 140° Faht. was fatal to all adult forms, but that on the other hand germs successfully resisted far higher temperature than any tried by Dr. Bastian, one spore having been seen to develope after having resistered a temperature of 300° Faht.

In responding to a vote of thanks, proposed by Sir Henry Cooper and seconded by Mr. Craven, the Lecturer gave some idea of the arduous character of his researches by stating that on several occasions the microscope had not been left for 36 hours, he and his colleague relieving each other at intervals of five hours, and that on one occasion he had himself remained at the instrument for nine hours without moving.

MEETING, JANUARY 27TH, 1879.

The President (Dr. Rollit), in the Chair.

Capt. A. Graham having been proposed as a new member, and a donation of a Fijian club to the museum announced, Mr. Thomas Brassey, M.P., delivered a Lecture on "Capital and Labour."

The Lecturer first controverted the statement that in this country the poor are continually growing poorer and the rich richer; at the same time allowing with regret that the inequality in the distribution of wealth is greater than is desirable. But as it has been found that in new countries, where to each settler equal quantities of land have been allotted, and equal advantages afforded, a few years make a great difference, some being prosperous and others proving unsuccessful, so it is not to be wondered at that in an old country the inequality is far greater, and the seeming injustice more evident.

Speaking of the *accumulation of capital,* he quoted Mr. Mill, who says "All capital was originally formed by saving; it is the produce of labour, but kept together by self-denial." Accumulations of capital not only enrich the owners, but support the vast multitudes who are occupied in the enterprises in which the capital is invested; and thus abundant resources enrich the whole nation. It is true that exceptional fortunes have been made by great inventors, by being first in the field in opening out new industries, or by the increase in the value of land caused by the growth of large towns; such advantages however are but temporary, competition soon reducing the profits.

The laws governing the rate of wages were next treated of, and it was shewn that the rate of wages is determined by competition, the competition of employers for workmen and of workmen for employ-

ment, and by the cost of the necessaries of life ; subject always to the universal condition that the workmen engaged in a competitive industry can produce as cheaply and as well as the workman abroad. In this country the price of labour is regulated not by the cost of living, but by the market price, or proportion between supply and demand. It is consequently dear when scarce, cheap when plentiful. After a period of depression prices augment in a more rapid ratio than wages, and after inflation they also fall more rapidly—a reduction of wages being generally the last resource of an employer in times of falling prices—consequently capital equalises beneficently the price of labour, and practically saves for the operatives by moderating the force of fluctuations. On the other hand reckless and inflated enterprise, by courting collapse, damages the working classes.

The wage classes have the remedy in part in their own hands ; they should be more thrifty, The British workman is distinguished by many good qualities ; it is a pity that these are counterbalanced by his thoughtless self-indulgence. But if the employers would set the example in thrift, it would be a great encouragement to their workmen.

Trade Unions were established to influence the law of wages by combination, and are the natural outcome of the present arrangements of industry ; but the eagerness of employers to extend their various undertakings causes a competition for labour, and thus raises wages independent of the unions ; which are also unable to arrest the downward movement of wages when trade is depressed. The reduction of the hours of labour in the engineering trades has been often quoted as an example in favour of trade unions, but this concession would not have been obtained if trade had been languishing. The unions might however, with advantage, watch legislation on behalf of the working class, and thus seek relief rather through legislation than revolution.

Amongst other useful measures proposed is an amendment in the law of compensation in case of accident, so that workmen may recover from their employers.

The opposition to piece-work by unions is wholly wrong ; they give no direct encouragement to diligence and excellence amongst their members, but endeavour to subjugate the individual to the arbitrary will of the corporate body, which is a fallacy, an unrestricted right to individual labour being a necessity.

Employers however are also responsible for want of interest in the technical part of business, and in the decorative arts especially matters of taste have not been sufficiently attended to in this country. In this particular greater progress has been made in recent years, owing to the influence of South Kensington, and the same thing must be done for the Mechanical Arts.

In conclusion, the Lecturer remarked upon the great supremacy held by this country in maritime enterprise which he believed would be rather strengthened than diminished in the future. A long discussion followed, in which the President, the Sheriff, Mr. Scaping, and a working man took part, and a vote of thanks was accorded to the the Lecturer by acclamation.

MEETING, January 28th, 1879.

The President (Dr. Rollit), in the Chair.

The Rev. W. B. Carpenter, Hulsean Lecturer at the University of Cambridge, delivered a Lecture entitled "Scenes and sketches of the Court of Louis XIV."

Prefacing his remarks with an allusion to the four great epochs into which Voltaire considered the history of the world had been divided, viz :—1, the Grecian or Athenian age ; 2, the Roman or Augustan age ; 3, the age of Florence, when she was the mistress of the Arts under the influence of the Medici family ; and 4th, the age of Louis XIV. at Paris, the Lecturer proceeded to direct attention to this last epoch.

This was indeed a great age if measured by its conquests, its military powers, and a certain class of literature, but was it great in the highest sense of that word ? Louis XIV, as gathering around him so many talented men, may perhaps be considered a great monarch. Left fatherless in early life, he was trained to be a grand king, rather than a great man, fed with stories of empire, imbued with the spirit of ambition, of conquest, and majesty ; taught to consider himself irresponsible, and to assume the grand air. The affairs of government, in the hands of the wily Italian Cardinal Mazarin, the politician and

patron of art, were at his death claimed by the king. It was his policy to collect together all the talent of the country, which gravitated to Paris as its centre, and in adulation of the monarch lost the freedom upon which depended its healthy vitality. Several scenes of Parisian and court life were graphically depicted by the Lecturer, who detailed with great clearness the characteristics of the leading warriors, preachers, and statesmen at the court of the grand monarch.

Under the influence of Madame de Maintenon in his later days, piety became the fashion at the court, and a gloomy and saturnine spirit took possession of the king, who, by the rigour with which he treated the offences of others, thought to expiate his own.

After some observations from the President, a vote of thanks was moved by the Vicar of Holy Trinity, seconded by Mr. Evans, and carried with acclamation.

MEETING, FEBRUARY 4TH, 1879.

The President (Dr. Rollit), in the Chair.

The Minutes of the last Meeting having been read, Messrs. C. F. Hewitt and F. Richardson were proposed as Members of the Society.

The President then introduced Mr. Bret Harte, United States Minister at Crefeld, who lectured on "The Argonauts of 1849, a story of Californian life." He first traced the early history of California, which, until recently, had been but little known, though visited a hundred years ago by Sir Philip Drake. The Spanish Catholics and the Mormons under Brigham Young, by their settlement at the great Salt Lake, being the real pioneers to the country. The landing of the Argonauts and the character and habits of the early settlers were then graphically described. Life in San Francisco in 1852, was also vividly pourtrayed ; its rough and ready people being chiefly characterised by easy adaptability to circumstances.

Later arrivals from the East transferred this type to the mountains, and the dwellers in the Sierras formed the subject of many humorous stories.

The appearance of the Heathen Chinee upon the scene, with his old conservatism, a devoted worshipper of the devil, though never ob-

truding his mythology, uncommunicative, but able to be tolerably even with his Christian persecutors, consuming his own peculiar provisions, and having his bones sent back to China after his death, formed the last of the lecturer's amusing pictures.

After some comments by the Chairman, a vote of thanks was moved by Dr. Elliott, seconded by Dr. Lamb, and carried with applause.

MEETING, February 11th, 1879.

The President (Dr. Rollit), in the Chair.

Several donations to the Museum having been announced, the President introduced Mr. Knatchbull-Hugessen, M.P., who delivered a lecture on "Oliver Cromwell."

The history of Cromwell, as taught at school, was, the lecturer said, that he was a person of low extraction, and of coarse manners, that his early life was passed in profligacy, and that afterwards, though a brave soldier, he was a bad and ambitious man; as to his religion, he was a mixture of canting hypocrisy and wild fanaticism; his public conduct he was utterly to be condemned, first, as a rebel against the king, then as a regicide, and finally as a usurper and cruel tyrant; that after he had reaped the reward of his treason he lived in perpetual dread of assasination, died unloved and unregretted, and that his death and the subsequent restoration of the Royal Family are equally unmitigated blessings to England. This belief might easily be held by anyone who took for his authority the histories of Hume and Smollett, or Clarendon; Macaulay and Carlisle have to be discounted on the other side as praising him too much.

No doubt Cromwell was a rebel against Charles I., but was the fact of rebellion against the king of itself a crime, without reference to the circumstances under which it occurred, or the provocation which occasioned it? If so, we must equally condemn all those who are concerned in the rebellion of 1688, which drove James II. from his throne, although that rebellion established the Protestant succession under which Queen Victoria now reigns over us. Again, was he at once to be condemned because he was a regicide? Then,

the lecturer contended, the Bible must be excluded from the schools in which such a doctrine is taught, for the Old Testament furnished them with several instances in which kings were killed by their subjects by the direct command of the Almighty. But, thirdly, were the death of Cromwell and the restoration of the Royal Family unmitigated blessings to England? It was almost needless to return the only answer which truth could give. Beyond all doubt England was more honoured and respected during the Protectorate of Cromwell than in the reign of the king who preceded or followed him. England was never so degraded as in the times which followed the glorious restoration of Charles II.; her reputation at home and abroad had sunk to an abyss from which it was only raised by the restoration which, in the following reign, drove the house of Stuart from the country which they had so sadly misgoverned.

In endeavouring to arrive at the truth with regard to an epoch or individual it was necessary, before they accepted any information as authentic, to scrutinise closely the source from which it had been derived. For many years after his death the character of Oliver Cromwell was left in the hands of his enemies, and there could be little doubt that the same miserable spirit which could wage war against his dead body would not hesitate to calumniate his memory and blacken his character by every possible device. Charles' despotism, persecutions, extortions, and want of faith had placed rebellion in the light of a duty, for the only alternative left to the people was to become rebels or slaves. The blood shed in fighting for liberty against prerogative was laid to the king's charge by many besides Cromwell, and those who took part in the death of the king wholly believed they were engaged in a righteous action, and that the country could not become settled and prosperous whilst he lived. Undoubtedly it was a political mistake, Charles' death being greater than his life, and ensuring the restoration of his family; his faults were forgotten, his virtues remembered. Cromwell may have been fanatical, but the lecturer contended that his life and letters, both public and private, sufficiently met the charge of hypocrisy. He had better reasons for guarding against assassination than those afforded by the imputation of a guilty conscience; and he died in the full belief that he had done

his duty, and been the chosen instrument of God to promote the good of the people. When the vistas of ignorance and prejudice have been swept away, he will be looked upon as a great patriot, occupying a foremost place in the roll of England's worthies.

The President called upon the Sheriff to propose a vote of thanks to the lecturer, which was seconded by Mr. Dibb, supported by Sir Edward Watkin, and carried.

MEETING, February 18th, 1879.

The President (Dr. Rollit) in the Chair.

Mr. Preece, C.E., Electrician, General Post-Office, London, lectured on "Recent Advances in Telegraphy."

In his introduction the lecturer remarked that the Telegraph is the property of the nation, and is kept in its high state of efficiency chiefly by the supervision and criticism of the press. This property is of enormous extent, comprising a hundred thousand miles of wire, and sending twenty-two millions of messages in a year, which involve one hundred million transactions. The newspaper services are worked at night so as to enable us to read at our breakfast table the news of the previous day.

Proceeding to details, he explained the Morse alphabet, and showed how words made up of such letters were transmitted to a distance by the aid of electricity.

The actions of the sounder, and of the key which starts the movements, were also explained and demonstrated, messages being despatched between the lecture hall and the post-office.

Duplex Telegraphy was next treated of, and two messages were simultaneously sent in opposite directions through the same wire.

The greatly increased rapidity of transmission obtained by Sir C. Wheatstone's invention of punching the message on a strip of paper was demonstrated ; a strip being punched by an assistant, these passed rapidly through the transmitting instrument, which forwarded the message to the post-office, whilst by another instrument called the receiver, a perfect *fac-simile* of the original strip was reproduced.

Lastly, the new writing telegraph of Mr. Cooper, which is able to transmit a message in one's own handwriting to a distant station, was described, and the lecturer stated his conviction that England is far ahead of all other countries in telegraphic invention.

The President having eulogised the lecturer, a vote of thanks was proposed by the Sheriff, seconded by Mr. Copland, and supported by the Postmaster.

LECTURE TO THE WORKING CLASSES,
February 25th, 1879.

Mr. William Saunders, of London, delivered a lecture on "The Organisation of Labour at Home and Abroad." The Sheriff presided, and there was a very large audience.

The lecturer spoke to the following effect:—For the first time in the modern history of the world, international competition is now in full operation. Hitherto circumstances have given to this country an undisputed supremacy in industrial enterprise, but for the future we have to run an equal race with competitors who are carefully copying all our arrangements; and, in some cases, applying them with an energy beyond anything which we have been enabled to display. Although this competition was unavoidable, we are surprised at, and in some measure unprepared for, the sudden change which has taken place in our industrial relations with other countries. In 1870 the United States imported 513,000 tons of iron and steel rails. In 1877 the quantity had diminished to 12 tons. There is no prospect of a revival of our iron trade with the States. Henceforth they will make their own, and compete with us in many of the markets of the world. They are sending to this country garden tools, watches, calico, and other manufactured articles, in the making of which we thought that we had no rivals. Germany and France are increasing their exports to the United Kingdom, and since 1873 the change in the condition of trade has been so great that, on the most moderate computation, and after making due allowance for freight and charges, the balance of trade is now against us to the extent of one hundred millions sterling per annum. We need not be

immediately alarmed at this. It is a rebound from the leaps and bounds of prosperity which we enjoyed at the commencement of the present decade. It is estimated that from 1865 to 1875 the accumulated profits in this country amounted to £235,000,000 per annum. A large portion of this vast amount was lent to foreigners, and is used to compete with us. Some of this was lost, but much of it was advanced on very favourable terms, and is now being repaid. We can, therefore, afford for a time to have a trade balance against us, but we cannot afford permanently to allow other nations to excel us in industrial enterprise. We have confidently supposed that we were secure in our mechanical supremacy, but machines can be copied, or even improved upon; and, if the machines cannot be improved, perhaps the workers of them may be placed in circumstances more calculated to stimulate their energies than are to be found in this country. When the hand-loom was superseded, thousands of working homes were overthrown, and for a long time great distress arose amongst the workers, while enormous fortunes were amassed by those who had the means and the wisdom to take advantage of the new inventions. Factory life took the place of home work—the master and workman ceased to be members of the same family—and society became completely divided into employers and employed. Many employers accumulated vast wealth, and the condition of trade became such that only large capitalists could enter upon it with a fair chance of success. Land increased in value with the increase of population, and as a continued rise in the value of any article causes speculation to be directed to it, so land has been bought up all over the country, and it has reached a price which puts its possession beyond the reach of all but the wealthy. The people are no longer interested in the soil. Land in this country has to support, first the landlord, then the gentleman farmer, and, after him, the uninterested labourers. Tradesmen have followed the example of manufacturers and landowners. The large ones have eaten up the little ones. A shopkeeper has ceased to live at his place of business; his business life is separated entirely from his home life; and his assistants no longer share with him the comforts of his home. Thus with manufacturers, agriculturists, and traders, all things have tended in the

same direction. Economically this is right, and under the new system we are better fed and better clothed than our ancestors. But with many advantages it has brought with it one very serious evil, an evil which is universally admitted and universally deplored—a complete separation of interest and feeling between employer and employed. The natural consequence of this has been the establishment of Trades' Unions. The circumstances of the working classes are such as to compel their union for mutual support. It is of the utmost importance that these powerful organisations should direct their attention to suitable objects. Men are not often reasonable when they are unanimous or when their interests are all on one side, and the absurdities which have been practised by Trades Unions can only be equalled by the absurdities practised by other collections of mankind who are acting as they suppose for their own advantage. Selfishness, like ambition, often "o'erleaps itself and falls on t'other side." Individual selfishness in opposition to the public interest is bad enough, but the collective action of a body of men all having one interest is worse. It is this fact which makes the separation of society into classes without knowledge of or sympathy with each other such a serious danger. Trades' Unionism is by no means confined to the working classes. Its most unwise and injurious manifestations are found amongst the upper strata of society. Lawyers' Trade Unions are perhaps the worst of all. The fact is society is attacked on all sides by selfish and unscrupulous combinations, and under the circumstances it is surprising that we are in any degree prosperous. While it is of great importance to prevent fraud and violence, which injure industry, it is still more important to seek by all means in our power to encourage energy and cause an equal distribution of the rewards of labour. Wealth accumulated in a few hands is a positive evil to any community. Wealth suitably distributed is in every respect an advantage. Another hindrance to industry is the present system of legislation, which puts upon an overworked Parliament the duty of investigating all proposed improvements—a task for which it is utterly unfit. This arrangement paralyses industry to a degree far beyond what is generally supposed. We have had some experience of this in the fact that Hull has been

prevented from making a new railway which has become essential for the full development of the trade of the port. The most important element in all industrial enterprise is to call forth the energies of the persons who are engaged in it. The interests of employers and employed in any undertaking are substantially identical, although emergencies constantly arise in which their claims are antagonistic. Both classes are interested in bridging over the gulf betwixt the two, but perhaps the capitalist is more deeply interested in this than is the workman. The artisan or the labourer can more easily seek his fortune elsewhere than can the capitalist. The owners of property in this country are deeply concerned in preserving its industrial and commercial supremacy. This supremacy will not be maintained if the more intelligent and energetic portion of the working classes are drawn from our shores, and the question of national importance is : How can an opening be made which will afford working men full scope for their energies, and give them a fair chance of advancement? We must again turn our attention to the fact that a separation of interests has been brought about by the introduction of new systems of production and enterprise, which have made huge factories and large concerns a necessity of the times. But is this separation of interest essential to the present system, and therefore unavoidable? It is not. The largest concerns in existence are co-operative in the sense of having a large number of shareholders. This co-operation will extend, and should be extended ; it affords the solution of the difficulty. It is not necessary that working men should form manufacturing or commercial establishments exclusively their own. Such a course is undesirable for many reasons, and mainly because one-sided action perpetuates rather than diminishes the evils of class separation. But facilities should be afforded for every class of persons engaged in any undertaking to become personally interested in its results. As far as possible, all persons engaged in a business should have a *permanent* interest in its prosperity. If they have a share in the profits only, they regard the immediate profit rather than the future welfare of the concern, and this often leads to a dangerous course ; but if facilities are afforded for making a genuine investment in the business, the result will be advantageous to all parties. It must be remembered

that national prosperity and advancement depends upon the condition of the people, and not upon the wealth of the few. Ultimately the value of property in this country will be determined by the prosperity of the working classes. Therefore let law and custom make way for their advancement, as far as law and custom can assist them. The lecturer, in conclusion, said the law, like Providence, helps those who help themselves, and by union, industry, and intelligence we may hope to see the people of this country advance their position until the existing inequalities will in a great measure disappear, and thus the peace and prosperity of all classes will be secured.

The Sheriff invited discussion, and remarked that he was struck with the able manner in which the lecturer had treated the whole subject. He quite agreed that if a better understanding between employer and employed, as suggested by Mr. Saunders, were promoted it would be much to the advantage of the country.

Mr. N. B. Billany, in proposing a vote of thanks to the lecturer, at some length addressed himself to the chief arguments of the lecture, which he characterised as a first-class contribution to their knowledge of political economy.

Mr. Bushell seconded the motion, observing that Mr. Saunders had ably considered both sides of the question.

Mr. Hatfield supported the proposition, pointing out the fairness and soundness of the lecturer's views.

The discussion was continued by Mr. Copland and the Rev. J. E. Symes.

The motion, which was briefly acknowledged by the lecturer, was carried with acclamation.

MEETING, March 4th, 1879.

The Sheriff, R. M. Craven, Esq., V.P., in the Chair.

Mr. Sullivan, M.P., delivered a lecture on "The House of Commons ; its History and Mechanism."

There is no legislative body in existence, said the lecturer, which so largely occupies the attention and influences the affairs of the whole

civilised world as the English House of Commons ; nor is there any that has been so successful as an Institution. But though easily, and indeed frequently, imitated by other countries, none of these imitations have been a success ; and even at the present moment in the English speaking colony of Victoria, the constitution has come to a dead lock. Why then has our House of Commons survived for hundreds of years, when even the latest copy of it could not survive ten years ? It is because it is the gradual growth of time, of custom, habit, and tradition.

The Anglo-Saxons had their Council of wise men—the Wittenagemot ; but William the Conqueror surrounded himself with what was called the Great Council, composed of all the great Barons who aided him in the conquest of this country. They were responsible, each within his Shire, for the administration of the law, but no representative Parliament existed until the reign of John, out of whose tyranny arose Parliamentary liberty in the land. Archbishop Langton and the Barons felt that they must have law, not personal despotism, and so the Great Charter was wrung from King John. In 1265, for the first time, Simon de Montfort, having obtained permission from Henry III, caused two Knights to be chosen from every Shire, and one or two Burgesses from every Town, to be summoned as a Parliament at Westminster, to sit with the Barons and the Clergy. That was the derivation of the English House of Commons. In the next reign a clause was added to the Charter, which enacted that no taxes should be levied upon the people without the consent of the Commons. This was the real foundation of all the powers, privileges, and liberties possessed by the present House of Commons. In the time of Edward II, it became the practice for the Commons to sit by themselves, vote by themselves, and conduct their affairs in a separate chamber. Not until the 17th Century did the House of Commons take a thought of things higher than money and nobler than mere taxation. In the Bill of Rights, passed under William III, came the form of goverment under which we now live, and in which the House of Commons was assured so great a part ; in it would be found every principle which is now claimed or exercised on behalf of public liberty by Parliament. At the opening of the reign of George III, it might

be said that the House of Commons became what it is now in the nation—the great arena in which public ambition sought honour, glory, and fame—and associated with all that was noble and all that was great in the progress of this country.

Owing to the circumstances connected with its history, the House of Commons had many antique usages and forms of procedure, wisely preserved as memorials of troublous times that ought never to be forgotten.

Many English people little knew how fortunate they were in the Institutions they enjoyed; and long might the House of Commons prove itself in the future what it had shown itself in the past—a healthful, jealous, prompt, and powerful vindicator of the national liberties.

A vote of thanks to the lecturer was proposed by the Chairman, seconded by Dr. King, and carried with great acclamation.

MEETING, March 11th, 1879.

The President (Dr. Rollit) in the Chair.

The Minutes of the last meeting having been read, the Astronomer-Royal of Ireland, R. S. Ball, LL.D., F.R.S., delivered a lecture on "The Recent Eclipse of the Sun."

This total eclipse of the sun, which was observed under very favourable circumstances in America in July of last year, was especially interesting as affording opportunity, not only of adding to our previous knowledge of the corona, but of determining the existence of the planet Vulcan, which there was reason to believe might be found in the immediate neighbourhood of the sun, and was therefore invisible at other times on account of the sun's superior brilliancy.

With the aid of a number of diagrams, illustrated by the oxy-hydrogen light, the lecturer explained the chief features of our Planetary system. He then described the steps taken by the observers of the eclipse to obtain all the information possible during the 2½ minutes that it remained total, which had resulted in the

actual discovery of the planet Vulcan, revolving in an orbit within that of Mercury, and of about the same size as the latter planet.

After some remarks by the President, a vote of thanks was proposed by the Sheriff, and seconded by Dr. Gibson.

MEETING, March 18th, 1879.

Sir H. Cooper in the Chair.

Mr. Geo. J. Romanes, M.A., F.L.S., lectured on "The Scientific Evidences of Evolution."

Beginning with a brief sketch of Darwin's theory of "Natural Selection," he proceeded to show that this theory is preferable to the old one of "Intelligent Design," because, though both will equally well explain the facts, it is more reasonable and logical to attribute them to the operation of natural causes, known to be sufficient, than to assume the continual interposition of a supernatural agent.

It would be proof positive of "Intelligent Design," if it could be shown that all the species of plants and animals had been created, or suddenly introduced, at each successive period of the world's history, as the conditions of life became suitable. On the other hand, presumptive proof of "Natural Selection" would be afforded by evidence that each species has been gradually evolved by the advantageous modification of pre-existing species.

The lecturer then treated of the arguments in favour of Organic Evolution that can be educed from the Natural System of Classification, from Morphology, from the existence of Rudimentary Organs, from Geology, from the Geographical Distribution of Plants and Animals, and from Embryology, and produced an array of evidence sufficient, he thought, to convince all reasonable persons of the truth of the theory.

In the discussion which followed, Sir H. Cooper contended that, though the theory of evolution was strongly supported by facts, and might in the future be proved to be absolutely true, it was as yet a matter in which we were not compelled to give up our previous beliefs. Dr. King addressed additional arguments in favour of the

theory, and concluded by moving a vote of thanks to the lecturer. Dr. Gibson seconded the motion, but ridiculed the theory. Mr. Evans spoke in support of the geological evidence of evolution.

MEETING, March 25th, 1879.

Sir Henry Cooper, M.D., in the Chair.

The Rev. J. P. Mahaffy, M.A., Professor of Ancient History in the University of Dublin, Knight of the Order of the Saviour in Greece, &c., delivered a lecture on "Modern Greece and her prospects."

The inheritance of a great name is often of doubtful advantage, said the lecturer, and the question is constantly asked—Can the Modern Greeks, pirates and bandits as they are, be the children of the old Greeks who fought at Marathon? By taking the name of Hellas and Hellenes the people have themselves challenged the comparison, and ignorance of Mediæval Greek history has prompted the question.

The present Greeks have many of the virtues of their ancestors, and they had many of the vices of their descendants; it was chiefly owing to external circumstances that Greece did not at present take a higher place in civilisation. There was much in the Modern Greek that was characteristic of his ancestors; the inhabitants of the towns and seaports are dark, ugly, and knavish; the dwellers in the country districts are fair, handsome, honest, and industrious, especially in the Morea. In Northern Greece, however, there was little industry in consequence of the nearness of the Turkish border, over which brigands could escape with ease.

The lecturer then traced the history of Greece from the time of Alexander to the present day, giving especial prominence to the Hellenism of the East through the Conquests of Alexander, and to the adoption of Christianity by which they became masters of Constantinople. He referred to the Conquest of Constantinople by the Frankish Crusaders, and the destruction of her vast treasures of art and learning; the oppression of the people, and

their consequent acquiescence with scarcely a struggle in the sovereignty of Mahomet. The forced tribute of Christian children, to become the janissaries of the Sultan, made the Venetian invasion appear as a relief, but they were again re-conquered by the Turks in 1715. Peter the Great now came forward as the proctector of the Greek religion and people, and the Russians have continued to follow up the same policy. Then succeeded the revolt against the cruelty of the Turks, and the great war of liberation, which left a free nation, indeed, but reduced to half its numbers, and without any leaders to guide it. A worthless governor was followed by the tyrant Otto, of Bavaria, whose despotism produced fresh revolutions, which drove him from the throne, and upon Prince Alfred's refusal to accept the offer, King George was placed upon it.

Since then the country has been for the first time really free, and her progress has been rapid. The education of the people is better than in any other country in Europe, and at Athens there exists a University where instruction is absolutely free of charge. When she succeeds in paying the interest on the National Debt her future will be assured, and the lecturer believed that Greece will attain to eminence when the Bulgarians, Montenegrins, and other rubbish of Eastern Europe, vamped up by Russia and by some English politicians, shall have proved their utter insignificance.

After some remarks by the Chairman, the Sheriff proposed a vote of thanks, which was seconded by Rev. J. Mc.Cormick, and carried with acclamation.

MEETING, April 1st, 1879.

The Sheriff in the Chair.

Mr. H. C. Sorby, F.R.S., President of the Geological Society, lectured on "The Structure and Origin of Meteorites and Meteoric Iron."

The lecturer first described the general phenomena attending the fall of Meteorites, and said that after having reached the surface of our globe they may be studied in various ways. On the present occasion he would confine his remarks to their mechanical construction.

Many years ago he had shewn in published papers that the microscopical structure of crystals in most cases enables us to ascertain how they were formed. Thus, for example, if they contain only fluid-cavities, inclosing water, they were formed by deposition from an aqueous solution; whereas, if they contain only glass-cavities, they were formed by igneous fusion, like the minerals in true volcanic lavas. This is the case with the olivine met with in meteorites, and therefore the igneous origin of the material appears to be well established. On further examination it may also be seen that some meteorites contain small, more or less devitrified, glass spherules, and many broken fragments of minerals and even of meteoric matter formed of such material, and consolidated before being again broken up. On reviewing all the facts it appears to be established that meteorites were formed as it were from volcanic ash, blown into fragments by intense mechanical disturbance in a highly heated atmosphere. If blown into such a cool atmosphere as that of our own globe, the small glass spherules would have long fibrous tails, like the so-called *Peles hair*, whereas those in meteorites are more or less perfect spheres, without any tails. Such a condition is now met with only on the surface of the sun, and the lecturer concludes that meteorites are portions of solid matter which has been blown off from the sun during the disturbances which give rise to the red flames, either recently or at an earlier period, when the activity of the sun was greater than at present. In conclusion he described the structure of meteoric iron and of various kinds of artificial iron and steel, which indicates that the peculiar characters of meteoric iron were due to very slow crystallisation at a high temperature.

After some remarks by the Chairman, a vote of thanks to the lecturer was moved by Sir H. Cooper, seconded by Dr. King, and carried.

MEETING, April 8th, 1879.

The Sheriff in the chair.

Several donations to the Museum by T. Walton, Esq., having been announced, and the Minutes of the last Meeting read by the

Honorary Secretary, Mr. G. B. Longstaff, M.A., M.B., delivered a lecture on "Preventive Medicine."

Having first explained what is meant by Preventive Medicine, the lecturer enumerated the principal diseases which destroy life. Of these, diseases of the lungs are by far the most fatal, accounting for more than one-fourth of the deaths in this country; then follow the zymotic or infectious diseases, which are especially fatal to the young, and cause one-sixth of the deaths; local diseases of internal organs, chiefly fatal in advanced life; convulsions; atrophy and debility; and old age.

The main causes of disease are four in number; impurity of the air, due to overcrowding or want of ventilation, and to the presence of dust and foreign particles. Bad water, especially water poisoned by sewage contamination. Atmospheric conditions of heat and cold, which only or chiefly affect those previously unhealthy; and alcoholic intemperance.

The lecturer then compared the mortality of Hull with that of other large towns, and of the country generally; and concluded that Hull is an unhealthy town, though not so bad as it had been some years ago. This opinion was arrived at from a consideration of the severity of the cholera epidemics, the amount of zymotic disease, and more especially the fatality from infantile diarrhœa. That this last is not due solely to a high summer temperature, nor to the size of the town, but to bad hygienic conditions, was shown by a comparison of Hull with Halifax, in which town the mortality from infantile diarrhœa is less than the average of the country at large.

The preventive measures recommended by the lecturer were the pumping out of the sewage, which at present can only get away at certain states of the tide, so that we are partially living over a ramifying cesspool; and the substitution of water closets, or at least the pail system for the present method of night-soil collection.

A discussion followed, in which the Chairman, Dr. King, Dr. Gibson, the Medical Officer of Health, and Alderman Seaton took part, and a hearty vote of thanks was accorded to the lecturer.

MEETING, April 15th, 1879.

The Sheriff in the Chair.

Judge Bedwell delivered a lecture on "Shakespeare's Sonnets."

The lecturer commenced by stating that the essay was intended as a grateful acknowledgement of the honour done him by the Institution in electing him to the privileges of Membership.

He pointed out how difficult it was to account for the outburst of force and talent in Elizabeth's reign. He considered that three prominent causes affected Shakespeare's position with his public: 1st, the importance of foreign affairs; 2nd, the degradation of the stage; 3rd, the prejudices of artificially educated minds; but he also called attention to the circumstance that the Bible was then becoming the literature of the household and the individual, and that many men have a struggle to learn even now that they may understand their Bibles none the worse for understanding their Shakespeare well. He dwelt on the enormous difficulties Shakspeare had to contend with in educating himself and the public to admire the products of a skill, the very existence of which when he began to write was problematical. He dwelt on his doubts of himself, and his need of a friend to encourage him.

He also touched upon the comparative freedom from coarseness of expression characteristic of the sonnets, and on the ardour of friendship between man and man as evidenced by the confusion in the use of terms of affection visible in the literature of that day, especially in the use of the word "Lover."

He sketched the few facts known of Shakespeare's earlier life bearing on the subject of the sonnets. For himself he laid the time of his entrance into London life earlier than 1586; while the date of the sonnets he placed between 1590 and 1596, with the exception of one, the 107th, which, as Mr. Massey had shewn, was written in 1603.

He pointed out that the sonnets shewed that while they were in progress Shakespeare had some special distress, which made him turn to his friend for comfort and sympathy.

Some of the sonnets were poetical exercises, some translations, and most of them were written for the amusement of a social circle of private friends, as mentioned by Meres in 1598. Many were poetic

exaggerations of passing incidents relating to the society. One of his friends was a lady of some talent who could play the spinet, and the poet either affected to treat himself as, or really was, her admirer against his will. This lady he ultimately describes as joining hands with his male friend to spite him, and he pretends to accuse each of them of robbing him of the other's love. A term of silence then ensues, which is broken ultimately by a group of reconciliation sonnets, which substantially close the whole series.

The lecturer then proceeded to read certain of the sonnets illustrative of these views.

The argument or key to the poems he took from the 144th sonnet, which shews that the poet treated himself as standing between two lives, one of comfort and the other despair. The better angel a man, right fair ; the worser spirit, a woman, coloured ill. And he shewed how, by grouping the sonnets round these two figures, their force could be better appreciated.

In conclusion he pointed out that the real question to be decided was whether the poet was in earnest in what he said, and whether there was any autobiographical ground-work for the production. He pointed to the arduous nature of the study and its great interest, the need of re-arranging the sonnets, and the importance of keeping the judgment suspended until due labour justified a final decision.

He gave his reasons for selecting the dates named ; for concluding that the sonnets were published by a breach of confidence, and for agreeing with Mr. Massey, and others, in thinking that Lord Southampton was the male person addressed in the sonnets. He warned the student against following out the lead given in the so-called dedication of 1609, and seeking to identify the W. H. of that document at all.

With respect to the allusions to the poet's advanced age in the sonnets, he considered them to be poetic exaggerations ; and, for himself, he thought that the portrait in the picture in the folio of 1623 shewed that the poet was prematurely bald, and he referred to the 73rd sonnet in confirmation of that view. He also called attention to the poet's expressed confidence that his verses to the better spirit would live for ever, and the expectation which he manifested that the verdict of posterity would be favourable on the merits of the poems.

He then gave a summary of the various views expressed by Schiller, Coleridge, Wordsworth, Hallam, and others, on the subject, and warned the student to abandon all feelings of self-esteem in studying in the sonnets the inner feelings of perhaps the most unegotistical writer that ever left his thoughts for the perusal of posterity.

At the conclusion of the lecture a vote of thanks was moved by the Chairman, and carried with acclamation.

MEETING, April 18th, 1879.

The Sheriff in the Chair.

The Right Hon. the Earl of Dunraven lectured on "Sporting in Canada."

Life in the woods, said the noble earl, developed many excellent qualities, and to his mind was a most luxurious mode of living. True luxury consisted in having few wants and being able to satisfy those wants. A bed made of Canada Balsam, the leaves or spiculæ of which lie perfectly flat, was, from the special construction of the branches and the sweet smell of the sap, one of the most enjoyable beds that could be constructed, and tended to induce sleep far more than the downiest bed at home. A birch bark camp was a most comfortable residence. It was made in the form of a square. Having selected a level piece of ground and cleared it of shrubs, the hunter erected four walls composed of suitable pine logs, and on these walls he raised the framework of the camp. These walls he covered with pieces of birch bark, and these again with logs to keep them in their places, and by filling up the cracks with moss he had a dwelling-house which was perfectly impervious to wind or weather.

Carrying canoes or baggage across land was a very formidable proceeding, and had to be done in a very cautious manner. An ordinary birch canoe would weigh 70lbs. A hunter's traps were so packed in his blanket as to form a compact bundle, which was carried on the back by means of a strap across the chest and another across the forehead. The regular weight a man was expected to carry in

the employ of the Hudson Bay Company was 80lbs., but an Indian or half-caste would carry twice as much for a very considerable distance.

The moose was the largest kind of deer. It stood about 18 hands high and weighed about 1,200lbs. It had many advantages over the rest of the deer tribe, but it had also some disadvantages which rendered it a comparatively easy prey to its greatest enemy—man. The cow moose dropped two calves which was much in favour of the race. On the other hand, its hoofs were so constructed that it sank into the snow, and this rendered it an easy prey to man and dogs. It had a most acute sense of hearing and scent. It was easily domesticated. He had seen a herd feeding within a few yards of a road, and had shot them within hearing distance of the noises of a farm house. This animal had a wonderful sense of hearing, and could distinguish between innocent and dangerous sounds in a marvellous manner. Thus it would not notice the snapping of a twig by the wind, but let a man only tread upon a twig and break it, and the moose would be off in a second. They fed on the stems and roots of water lilies, the young shoots of moose wood, ground maple, alder, birch, and other trees.

There were several methods of hunting the moose, the most exciting of which was that of moose calling. This was done by imitating the sound of the cow moose calling to the bull. Only during six weeks of the year could this method be adopted, in the months of September or October. To successfully call a moose it was necessary to have a perfectly still and moonlight night. It was also necessary to have a piece of broken country, for the moose would not show itself far in the open. The greatest enemy a hunter had to contend with was the cold. Carrying a pack through a forest on a hot September or October afternoon was warm work, but towards morning it would probably freeze, and as the hunter could not either light a fire or walk about to keep himself warm, or his blood in circulation, he was very likely to suffer before long from the cold. The instrument with which the hunter called the moose was a cone-shaped piece of birch bark, large enough at one end to fit the mouth and at the other end two or three inches wide. Some Indians, by long practice, could imitate the calling of a cow moose in a most

wonderful manner. The call was at first made very low, and then after waiting half-an-hour it was repeated a little louder, and so on during the whole of the night. No two female moose voices seem to be alike, so that even an amateur could hope to be successful, and he (the lecturer), had succeeded in calling up three of the animals, a feat of which he was very proud. The bull moose was a very cautious animal, and when close to the cry which he was answering was extremely careful in his movements, and the slightest mistake on the part of the hunter would send him away; but by working upon his jealous temperament by imitating the grunt of another bull he was often lured to his death. The most exciting part of moose calling was when a bull answered at intervals but would not venture into the open, and consequently the hunter and moose would spend a whole night in trying to outwit each other. On other occasions, however, a cow moose would answer the call, and then the bull would, without the slightest hesitation, depart. If, however, two bulls appeared upon the scene, a terrific fight would ensue, and the noise that two of the animals, or even one, would make, was something remarkable.

The only other legitimate method of hunting the moose was by creeping. This was very similar to deer stalking in Scotland. A windy day was absolutely necessary for this method of hunting. The smallest sound must not be made, and the very greatest caution was necessary, as the least thing would startle a moose, and then it was off like the wind. A moose might also be run down in mid-winter on snow shoes. This might be called equally an illegitimate and legitimate method of hunting. When the snow was deep upon the ground in early spring, as soon as a moose was seen, the dogs had only to be set after him, and he floundered and sank in the snow, and soon becoming exhausted was easily despatched. The trappers often snared the moose, and dug pits in which to trap it. By this nefarious means many thousands of animals were slaughtered simply for the sake of their hides.

Earl Dunraven then described the mode of carriboo hunting, which was not so exciting as moose hunting.

Canada and Nova Scotia still possessed some of the finest salmon rivers of the world, and it was altogether impossible to spend a holiday more profitably than in the woods of Canada.

The lecturer concluded by saying that the whole of Canada was interesting to visitors, as showing the development of what in future would be a great nation ; for whether in connection with this country, or as independent, or as joined to the United States, that country which is now called British North America would assuredly some day support the strongest, the most powerful, and most masterful population on the continent of America.

After a few words from the Sheriff, a hearty vote of thanks was accorded to the lecturer, on the motion of Dr. King, seconded by Mr. Arthur Rollit.

MEETING, April 22nd, 1879.

The Sheriff, Vice-President, in the Chair.

Mr. Charles Copland, C.E., delivered a lecture on "Artificial Lighting."

The lecturer brought under the notice of the audience the various methods and appliances for securing artificial light, remarking that the consideration of the best materials and apparatus for providing pure, cheap, and steady means of lighting was a subject of the greatest interest to all classes of the community. The inventor who could perfect a system which would improve the quality and cheapen the cost of the means of illumination would be a benefactor to his race; and it was not too much to say that but for artificial light the progress of civilisation would not have been so rapid as it had been during the present generation. The lecturer briefly noticed the progress of means of lighting from the earliest ages of mankind, from the period when the blazing faggot from the camp fire would be the readiest and most required; incidentally alluding to the shell lamp, the lamp in use amongst the earlier races of India, those found in the ruins of Pompeii, and the tombs of the Egyptians, as furnishing specimens of these vessels in metal and clay, which were similar, he said, to those in use at the present day in Italy for burning olive oil. Speaking of the manufacture and use of candles, on which head the lecturer gave some curious and interesting statistics, he said that prior to 1832 candles were taxed, and the poor were compelled to dip

their own rushes. Now, thanks to the enterprise and ingenuity of Palmer, Price, Field, and others, the poor had greater illumination and brilliancy in their lighting than the nobility of a hundred years ago. Oil lamps, Mr. Copland observed, were not introduced in the streets of London until the reign of Charles II., and then they were only lighted from Michaelmas to Lady Day, and only from sunset to midnight. Very little progress was made in lamps until two Frenchmen introduced their inventions, and Argand's arrangement became the adopted system. With these exceptions nothing was done until the latter part of the 18th century, our ancestors being satisfied with a lamp which was practically a liquid candle.

As illustrating the manufacture of various qualities and descriptions of candles in use at the present time, Mr. Copland drew attention to the operations of one of the largest concerns in the kingdom, namely, Price's Patent Candle Company, who employed 1,300 hands, and consumed annually 25,000 tons of coals. Mr. H. M. Wilson, the manager of the company, had kindly given some specimens of the whole of the materials used in the manufacture of their candles, and he thought they would make an interesting addition to the museum.

The lecturer, at very great length, next spoke of the discovery and application of common coal gas, and reviewed the history of its struggles. At the present time the gas interests at home and abroad represented a little over £300,000,000. Mr. Copland alluded to Sugg's experiments with the Argand burner, and said that, having personally inspected the system of lighting in London, as arranged by Sugg, he considered it a great success, both as to cost and lighting, in comparison with the electric light. The lamps which had been placed outside the Royal Institution would give them a fair idea of the difference between the present street lighting and the new system. There was also one of these lamps in the room, which gave a very pleasant and soft light even there. Speaking of the Argand burner of Mr. Sugg, Mr. Copland said it produced a far steadier light with common gas than any other form. It had not been so generally used for internal lighting until Mr. Sugg apportioned its parts and supplied it with a delicate self-regulating apparatus. The lecturer then

described, with some amplitude, the various gas-burners and their qualities, the process of the manufacture of coal gas, the difficulties in the way of supplying it pure, the delicate operations on which the lighting of a town depended, and the relative illuminating power of gas supplied in different large towns ; and gave some practical hints and suggestions as to the economical consumption of gas.

He then passed on to an explanation of the different electric light inventions, but, to the great regret of the audience, was compelled, by want of time, to abandon much of his carefully-prepared paper in reference to the new system of lighting. He succeeded, however, in producing several interesting and beautiful experiments. In conclusion, he said :—Much nonsense has been written and spoken respecting the disuse of gas, which would follow the introduction of electricity. The same was said of oil and candles when gas was introduced, yet more of both these illuminants are now used than ever. The consumption of gas, instead of lessening, will probably receive an additional stimulus from the use of gas-heated boilers, gas engines, gas cooking, and the use of gas for heating apartments. The brilliant effect of large spaces lighted by the electric light causes the present dimly-lighted streets to look dark by comparison. A higher standard of gas will be called for, and shopkeepers and others, who are unable to adopt electricity, will do their best to keep up an appearance, beside their more fortunate neighbours, by an extra consumption of the older illuminant. There is nothing at present in the advance made by the electric light to interfere with the use of gas in private houses—the supply of which is by far the most profitable source of revenue to a gas company—the receipts for the public lamps, both in London and in the provinces, being rarely more than five per cent. of their annual rental. That electricity will be adopted wherever possible, and where the cost of the same is not an object, there is little doubt, it being specially adapted for the illumination of large open spaces, workshops, spinning mills, contractors' works, docks, railway stations, and for naval, military, and light-house purposes. The electric light has yet many difficulties to conquer, which will require an enormous amount of energy and resource. It is comparatively easy to kindle a great light, and dazzle the eyes of

the multitude, and the latter hardly care at present what the light costs, or whether it can be made available for common use. The large proportion of actinic rays in the spectrum of the electric light, which is closely allied to that of the sun, makes it an invaluable agent to the photographer, both for taking portraits and for printing operations, and many of the London and Parisian artists have been so using it for some time past. If the electric light is hermetically enclosed in a glass vessel, absolute safety is ensured, and it will be found especially valuable for submarine purposes, for lighting the galleries of coal mines, and for the manufactories of explosive compounds, which can now only be made during the hours of daylight. There is every reason to expect that great improvements will yet be made on the present method of electric lighting. If machines, worked by engines, could be dispensed with altogether, and a simple battery be found, which would be free from the drawbacks hitherto inseparable from their use, great results would follow—foremost, the introduction of the light to private houses; though I think there would then still be as much diversity of opinion as now exists amongst the public as to the value and effect of gas, oil, petroleum, or candles. The Electric Light, if used without shades, must always be a cold, searching, and peculiar illuminant, only pleasing to a certain portion of the community. Nevertheless, should it remain in the same state as at present, the wholesome stir it has made throughout the world, will, in all probability, be conducive to still greater improvements in the quality and price of coal gas. Indeed, if its only result was the perfection which Mr. Sugg has attained by his improvement in the Argand burner, both for street and house illlumination, the general public have good reason to be thankful.

Mr. Preece, of the London Postal Telegraph Department, spoke of the able and exhaustive manner in which Mr. Copland had treated the subject of his lecture. The result of his (Mr. Preece's) studies had been to completely confirm Mr. Copland's view as to electricity having a field of its own; that it did not in any shape or form interfere with the function of gas. He proposed a vote of thanks to Mr. Copland for his lecture.

Mr. W. T. Dibb seconded the motion, regretting that much interesting matter which Mr. Copland had prepared for their

edification had not, for want of time, been touched. He hoped that that portion referring to electricity would form the subject of a future lecture.

The motion was carried with acclamation.

LECTURE TO THE WORKING CLASSES.

APRIL 29TH, 1879.

Judge Bedwell delivered a lecture on "The Microscope," to a very large audience. The President (Dr. Rollit) occupied the Chair.

Having alluded to the old Hull Microscopical Society, which had done such good work in times gone by, and to the new Microscopical Section of this Society, formed within the last few weeks, the lecturer recommended the Rev. J. Wood's "Common Objects for the Microscope," and Dr. Carpenter's manual on "The Microscope," as guides for those beginning the study. He then showed the kind of instrument required, explained the method of using it, and described, with considerable detail and in a graphic manner, the necessary outfit for the Microscopist, the best ways of finding objects of interest in the ponds and ditches of the district, how to secure them, and how to mount and examine them when brought home. The latter part of the lecture consisted of a description and history of the numerous beautiful and interesting diagrams which were displayed in the lecture theatre

After some remarks by the President, a vote of thanks to the Lecturer was moved by Mr. Copland, seconded by Mr. Billany, and carried with applause.

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Rev. W. LUDDINGTON	A young Turtle, Scorpion, Spider, Snake, Iguana, Centipedes, and Chameleon.
Mr. E. P. DIXON	A Snake.
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Mr. WILLIAM SAUNDERS ...	An Amherst Pheasant, in glass case.
Captain SCAPING	Skin of Boa Constrictor.
Captain FISHER	Snake, and Palm Leaf Fan.

GEOLOGY AND MINEROLOGY.

Captain J. DRYDEN...	Copper Ore from Norway.
Mr. T. TATHER...	Fossils from the Coal.
Mr. CHARLES COPLAND ...	Specimen block of Bayhead Cannel Coal.
,, ...	Specimen of Lesmahago Cannel Coal, Fife.
,, ...	Specimen of Cannel Coal, Wigan.
,, ...	Specimen of Bituminous or Gas Coal, Wharncliffe.
,, ...	Specimen of Graphite, or Carbon Deposit, from inside of Gas Retort, representing the material from which the Carbon Points of the Electric Light are manufactured.
Mr. H. M. WILSON (Price's Patent Candle Company), per Mr. COPLAND	Specimens of Ozokerit, or Earth Wax.
,, ...	Specimens of Products from Coal Tar.
,, ...	Specimens of Products from Palm Oil.
,, ...	Specimens of Candles made by the Company from the above materials.
Captain HURST	Fossil Wood from Chowan River, South Carolina.

ANTIQUITIES.

Rev. CANON SCOTT...	A Roman Medal.
Mr. J. A. BULMER	Ancient Pottery from Cyprus.
Mr. J. P. NASH...	Ancient Roman Lamps from Carthage.
Mr. W. STEPHENSON	Roman Pottery from Easington.
Mr. BOTTERILL	Tesselated Pavement and Drawing.
Mr. J. K. MASON	A Crown Piece of James II., and a Liverpool Token.

MISCELLANEOUS.

Mr. T. WALTON	Fijian War Club.
„	A New Zealand Walking Stick.
„	A New Zealand Merai.
Captain WILSON	Kaffir Assegai, Natal.
Captain T. LINDSAY	A Caheza from West Coast of Africa.
Captain ROBINSON	A Fijian Chief's Club
Captain DRYDEN	An Old Spear-head from Norway.
Messrs. E. DAVIS & Co.... ...	An Enfield Rifle the last muzzle-loader of the British Army.
Mr. F. LILBURN	A Sabre from Balaclava.
Mr. WINCH	A Glass Walking Stick.
„	An Irish Faction Flail.

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The Society	Proceedings of the Royal Irish Academy, 1875, 1876, and 1877.
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,, ...	Book from Strasburg, dated 1556.
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	£2414	18	7

PHILOSOPHICAL SOCIETY.

ACCOUNT

ENDING 30TH APRIL, 1879. Cr.

	£	s.	d.	£	s.	d.
By Balance at Peases & Sons				365	11	8
„ Subscriptions 1878-79—711 at 21s.	746	11	0			
„ „ 1 at 20s.	1	0	0			
(1878) Arrears received	3	3	0			
712	750	14	0			
Less (1879) Arrears 63—649	66	3	0			
				684	11	0
„ Season Tickets (17)				8	18	6
„ Life Members (5)				52	10	0
„ Rent of Theatre and Rooms				112	14	6
„ Admission to Museum and Saturday Afternoon Lectures				111	19	1
„ „ Sessional Lectures				139	4	6
„ „ Gilchrist „				14	0	6
„ Rent of Houses in Waltham Street				41	16	8
„ Subscriptions to School of Art Fund				299	8	0
„ „ Saturday Afternoon Lecture Expenses				6	6	0
„ Insurance Companies for Fire in Museum				41	17	0
„ Bank Interest (Peases & Sons)				3	19	0
„ Amount due to Bankers				1324	4	3
				£3207	0	8

EXPENDITURE. Cr.

	£	s.	d.
By Subscriptions and Donations to School of Art	299	8	0
„ Amount Transferred from Income	425	14	8
„ „ Balance at Bank—brought down	365	11	8
„ „ Due to the Bank	1324	4	3
	£2414	18	7

CHARLES COPLAND, M.I.C.E., *Treasurer.*

LIST OF MEMBERS.

HONORARY MEMBERS.

Cook, R. L., Kingston-square
Cooper, Sir H., M.D., Park-street

Harrison, R., George-street

Kemp, Rev. H. W., B.A., Charter House
Kendall, W. H., London
Kendall, Mrs. W. H., London
Keyworth, W. D., Savile-street
King, Dr. K., F.R.C.S., George-street

Longstaff, G. D., M.D., London
Lee, J. E., F.G.S., Torquay

Moss, J. S., Parliament-street

Pearsall, Thos. J., London

Redford, Rev. R. A., M.A., L.L.B., London
Rollit, Arthur, Spring Villa

Spence, W. B., Florence

60 LIFE MEMBERS.

Allison, E., Blanket-row
Allison, H., Blanket-row
Atkinson, H. J., J.P., London

Bailey, Wm., J.P., Winestead
Bedwell, F. A., Bridlington Quay
Blundell, H. S., Bridlington
Bowlby, G., Parliament-street
Burkinshaw, W. P., Parliament-street

Carlill, J. G., Parliament-street
Clark, J. R., Subscription Library
Cooper, J. S., Parliament-street
Copland, C., M.I.C.E., The Park
Craven, R. M., Albion-street
Craven, Mrs. R. M., Albion-st.

Davidson, W., Vittoria Hotel
Dawber, J., Parliament-street
Dalton, J., Kirkella

Denison, W., Clyde-terrace
Dibb, Mrs. W. T., Beverley-rd.
Dixon, E. (Blundell & Co.)

English, E. W., High-street
Evans, T. M., Albion-street

Gadsden, A. W., Ewell Castle, Surrey
Garbutt, D. P., Anlaby-road
Garthorne, C., Dorchester-terrace
Gibson, H., Prospect-street
Glossop, W., The Park
Gregson, J. (Yorks. Banking Co.)
Grotrian, F. B., Hessle

Jackson, A. M., Crown-terrace, Anlaby-road
Jackson, F., Albert-terrace, Anlaby-road
Jackson, H. P., High-street
Jackson, W. M., Parliament-st.

Jacobs, J. L., Beverley-road
Jameson, J. A., Canning-street
Jameson, R. F., Queen's Dock side
Jameson, W. B., Queen's Dock side
Johnson, C. H., Albion-street

King, Mrs. K., George-street

Lamb, G., Anlaby-road
Laverack, E., County Buildings
Longstaff, G. D., M.D., London
Longstaff, L. W., F.R.G.S., London
Lunn, W. J., M.D., Charlotte-st.

Macmillan, A., M.D., Regent-terrace

Pickering, C., 114, Coltman-st.
Priestman, T., Parliament-st.
Pyburn, Jas., M.D., Albion-st.

Reed, E. J., C.B., M.P.
Ripon, Most Hon. Marquis, K.G., Studley Park
Rollit, A. K., LL.D., B.A., Anlaby-road

Samuelson, B., M.P., Banbury
Saunders, Wm., Mount View, Streatham, S.W.
Scott, F. A., Parliament-street
Stromer, P., High-street

Tiffen, Joseph, Beverley

Wake, C. S., Wright-street
Wilson, Arthur, Tranby Croft
Wilson, H., Savile-street
Woodhouse, S., High-street

649 SUBSCRIBING MEMBERS, 1879.

Adams, H. L., Bank-street
Allott, W., Bowlalley-lane
Amos, C. F., Albion-street
Anderson, F. B., Hessle
Anderson, J. B., Beverley-road
Anderson, W. A., Pease's Bank
Ansell, C. W., Wellington-street
Ansell, A. W., Anlaby-road
Appleby, F., Queen's Dock Side
Appleyard, G. T., Boulevard
Archibald, J., Whitefriargate
Askam, J. F., Market-place
Atkinson, J., Parliament-street
Atkinson, A., Osborne-street

Baggs, John, 13, Lowgate
Bailey, W. S., Anlaby-road
Ball, T. D., Pryme-street
Balchin, E., Mytongate
Banks, Mrs., 5, Dorchester-terrace
Bannister, C. H., Florence Avenue
Barker, J., 22, Silvester-street
Barker, J. C., 8, Colonial-street
Barker, R. H., Spring-bank
Barnett, B., Whitefriargate
Barnby, Henry, Alexandra-road, St. John's Wood
Barton, B., Bishop-lane
Barrett, H. J., Clyde-terrace
Battersby, J. D., Lincoln-street
Baxter, R., Coltman-street
Baynes, J. Jun., F.C.S., Scale-lane
Bayliss, G., Station Hotel
Bean, J. S., Queen-street
Bean, W. W., Story-street
Beasley, W. C., 2, Dr. Johnson's Buildings, London, E.C.
Beaumont, J. P., Eldon-terrace
Beaumont, W. S., Eldon Grove

Bell, A. F., 4, Humber-place
Bell, J. P., M.D., Waverley-street
Bell, C. B., Spring-bank
Best, H., Dock Office
Birks, H., Quay-street
Blyth, R., High-street
Boden, J., High-street
Bohn, G., M.I.C.E., Bowlalley-lane
Bolton, E. (Jameson & Co., Canning-street)
Booth, J., The Park
Booth, Col. Haworth, Malton
Botterill, W., Parliament-street
Botterill, W. H., 7, West-parade
Bowker, Rev. H. C., M.A., John-street
Boyd, H., 11, East-parade, Holderness-road
Boyle, Rev. J. R., 20, Peel-street
Briggs, H. H., Prince's Dock Side
Briggs, G. J., Spring-bank
Briggs, J., Clyde-terrace
Broadley, W. H. H., M.P., Welton
Broadhead, Captain, Trinity House
Brock, Clutton H., Linnæus-st.
Brodrick, F. S., Bowlalley-lane
Brodrick, H. S., Spring-bank
Brodrick, Major, Prince's Avenue
Brown, A., Savile-street
Brown, W., Grosvenor-terrace
Brown, W., Junr., Anlaby-road
Buchanan, Capt. D., 120, Coltman-street
Buckton, Thomas, High-street
Burkinshaw, W. P., Parliament-street
Burroughs, J., 32, Coltman-street
Butts, R. G., Ferriby

Camp, Wm. Hall, 3, Blenheim-terrace, Norfolk-street
Campbell, M., Alexandra-road, Newland
Campbell, W. B., *Hull Packet* Office
Canby, J. S., Waterworks-street
Carlill, B., 23, Parliament-street
Carlill, E. H., Hutt-street
Carlill, J. G., 4, Parliament-st.
Carnley, H., M.D., Charlotte-st.
Carpenter, Rev. A. B., M.A., Anlaby-road
Carr, T. B., Kingston-terrace, Beverley-road
Carr, G. H. (Tully & Carr, Castle-street)
Carrick, T., Jarratt-street
Carrick, R. (Mr. Watson, Solicitor)
Cattley, R. C., Beverley-road
Chambers, R. W., Leicester-street
Chapman, Alderman, Holderness-road
Chapman, G. E., 2, Park-road
Chapman, J., Castle-street
Chatham, J. P., Hutt-street
Chester, C. E., 13, Percy-street
Chessman, C. W., High-street
Chilman, J. W. (C. J. Todd, Bowlalley-lane)
Christie, T. F., Clyde-terrace
Clark, C. G., High-street
Clark, G. W., 4, Albion-street
Clarke, G. H. (Morley & Co., Humber Dock-street)
Cohen, S., Queen-street
Colley, J., Chariot-street
Collingham, 35, Margaret-street
Collison, R., Land-of-Green-Ginger
Cook, T., Market-place
Cook, H. (Thompson, Cook and Son, Parliament-street)
Cook, J. (Thompson, Cook and Son, Parliament-street)
Cooke, B., Savile-street
Cooke, J. A., *Hull News* Office
Cooper, W., C.E., Boulevard

Cooper, Sir H., M.D., 56, Park-street
Cooper, R. W., Caroline-street
Corrie (Corrie, Hill & Co., Bishop-lane)
Coupland, George, Beverley Station
Craig, Rev. S. B., M.A., St. Mark's Vicarage
Croft, J. S., Beverley-road
Crook, P. T., Trinity House-lane
Cross, M. H., 23, Freehold-st.
Cross, Rev., F.R.A.S., Appleby Vicarage
Crosskill, W., Parliament-street
Crowther, J. J., Arlington-street

Daly, O., M.D., Albion-street
Darling, H., Chariot-street
Darling, W. W., Albion-street
Davies, T. E., Savile-street
Davis, E. C., Kirkella
Davis, E. L., Paragon Station
Dawson, R., Scale-lane
Dawson, W., 11, Morpeth-st.
Dawson, P. W., Beverley-road
Dawber, W. C., Linnæus-street
Day, C. W. (J. J. Thorney, Parliament-street)
Dearman, S., 22, Spring-street
Denniss, H., West-parade, Anlaby-road
Denniss, T. (T. Holden & Son, Parliament-street)
Dennett, R. E., 10, Argyle-st.
Dibb, W. T., Beverley-road
Dixon, Miss R. E., 57, Queen-street
Dixon, Rev. J. M., 12, Linnæus-street
Dixon, R. A., 57, Queen-street
Donaldson, A., Prince's Dock-street
Donner, C. H., Clyde-terrace
Dossor, J., George-street
Dougall, A., Sculcoates Gas-works
Downs, T., College-street
Downs, J., The Elms, Beverley-road
Dowsing, W., Beverley-road
Drury, E., Coltman-street
Dryden, J., Coltman-street
Dumoulin, V., Frederika-terrace
Duncan, A. W., Coltman-street
Duncombe, Admiral the Hon. Arthur, Kilnwick Percy

Earle, J., Junr., Linnæus-st.
Earle, E., Granville-terrace
Earle, F., The Park
Earle, S., High-street
Easten, W. E., Market-place
Easten, A. H., Crown-terrace
Easton, N., Beverley-road
Eeles, E. G., Whitefriargate
Ehlers, J., High-street
Elam, E., Boulevard
Ellershaw, A., Kingston-terrace
Elliott, G. F., M.D., M.A., Albion-street
Elsworth, F., Beverley-road
Elsworth, J. S., Holderness-rd.
England, R., Jarratt-street
English, E. W., High-street
Evanson, R., Prospect-street
Evington, C. S., Lincoln-street

Fargus, J., High-street
Fawcett, I., Waterworks-street
Fea, W. A., Spring-bank
Feldman, H., Lowgate
Fewster, C. E., Harley-street
Field, J., High-street
Field, R., Market-place
Finningley, J., 27, Hutt-street
Fishbeck, F. B., 2, Nile-street
Fisher, J., Garrison-side
Fisher, J. M., M.D., Anlaby-road
Flint, T. W., J.P., Anlaby
Flodman, P. T., Anlaby-road
Foale, W., Minerva-terrace Spring-bank

Foale, W., Jun., Minerva-terrace, Spring-bank
Ford, C., Coltman-street
Ford, W., Coltman-street
Foster, F. M., M.D., Whitefriargate
Foster, Miss, George-street
Foster, W. H., 9, Scale-lane
Fountain, J., J.P., Anlaby-road
Frankish, Miss E., 16, Cavendish-square
Fraser, E., Spring-bank
Frost, Alfred, 10, Eldon Grove
Fryer, G., Grimston-street
Fullerton, F., Savings' Bank
Fussey, W., Ocean-place

Gale, R., *Hull News* Office
Garbett, —, Dock Office
Gardham, —, Cogan House
Gardner, S. Waterhouse-lane
Garthorne, W. R., Beverley-road
Gething, J., Whitefriargate
Gibson, J. H., M.D., Wright-street
Gilmore, Rev. M.A., Park-street
Gleadow, H. C., Beverley-road
Goddard, W. E., Anlaby-road
Godfrey, G. B., 2, Granville-terrace
Good, C., West-parade, Anlaby-road
Good, T., High-street
Goodman, A., 14, John-street
Goodman, B., New George-st.
Gosschalk, E., Clyde-terrace
Gough, J., Savile-street
Goy, D., Spring-bank
Graham, Capt. A., Albany-st.
Grantham, W. L., Park-row, Park-street
Gray, J. P., Newington
Greasley, T. H., Whitefriargate
Greetham, Miss, Beverley-rd.
Gregson, T., Sutton
Gresham, C. E., Parliament-st.
Hagestadt, W. A. (Bailey and Leetham)
Haller, T., Anlaby-road
Halliday, Mrs., 36, Park-street
Halden, J. W., Anlaby-road
Hammond, R., Hessle
Hanger, —, (Hamilton & Co.) Trippett
Hansell, W., Charlotte-street
Hanwell, W., Charlotte-street
Hardy, G., High-street
Hardy, E. P., Regent-terrace
Harland, E., Manor-street
Harland, W., Chariot-street
Harland, J., Lansdowne-terrace
Hair, W. A., Louis-street
Harker, P. H., Spring-bank
Harrison, J., C.E., Spring-st.
Harrison, R. E., D.L.S., George-street
Harrison, W. B., Dock-street
Hart, G. W., Anlaby-road
Hart, R. S., 10, Stanley-terrace, Anlaby-road
Hartog, Henri, Frederika-terrace
Harvatt, W., Whitefriargate
Hawdon, J. W., Old Foundry
Hay, J., Savile-street
Hay, W. B., M.D., Albion-st.
Hayes, C. B., 12, Arnold-street
Healey, T. St. C., Beverley-rd.
Hearfield, John, Southfield, Hessle
Heath, Rev. L., Newland
Hedger, T., Arlington-street
Hellyer, C., Walker-street
Herschfield, J., 39, High-street
Heseldon, C. W., Vane-street
Hewerdine, G. F., Milton-terrace
Hewitt, C. E., Chapel-lane
Hewitt, T. F., Park-street
Hewson, W., Coltman-street
Hill, A. G., High-street
Hill, M. (Corrie, Hill & Co.)
Hill, J. H., Parliament-street

Hiort, C., 2, High-street
Hodge, G. High-street
Hodgson, R., Bank-street
Holden, J. F., Land-of-Green-Ginger
Holder, F. W., Whitefriargate
Holder, W., Holderness-road
Holdich, C. W., Queen-street
Holmes, C. D., English-street
Holmes, J. D., Queen's Dock-side
Holmes, S., Anlaby-road
Holt, H., 28, High-street
Hootton, J. W., 51, Wright-st.
Hornstedt, C. A., Commercial-road
Horsley, J. H. Anlaby-road
Horsley, W., Paragon-street
Howden, G. H., Anlaby-road
Hudson, W., Silver-street
Hudson, J., Newland
Huffam, W. T., Lowgate
Hughes, —, 61a, Peel-street
Hume, D. E., Dock Office
Humphrey, E. S., High-street
Humphrey, T. R., Arlington-street
Hunt, Wm., *Eastern Morning News* Office, Whitefriargate
Hunt, W., Clarendon-street

Ingleby, E. W., Bowlalley-lane
Ingoldby, J., Scale-lane
Irving, W., Anlaby-road

Jackman, G. F., The Park
Jackman, E., Broadley-street
Jackson, F., Albion-street
Jackson, J. A., Parliament-st.
Jackson, R., Albion-street
Jackson, T., Leicester-street
Jacobs, B. S., Beverley-road
Jagger, J., Park-road
Jameson, R., Eastella
Jarratt, Rev. Canon, M.A., North Cave
Jeff, A., Coltman-street
Johnson, A., Silver-street
Johnson, C., Story-street
Johnson, H., The Park
Johnston, W., 28, Silver-street
Jones, W. H., Pryme-street
Jones, A. H., Bank of England
Jordeson, G. S., County Buildings
Joy, D. G., Church-street
Judge, C., Trinity House-lane

Kelsey, W., Holderness-road
Kelsey, C., Anlaby-road
Kemp, Rev. H. W., B.A., Charter House
Kemp, M., Spring-bank
Kershaw, W., Beverley-road
Kessen, A., Charlotte-street
Keyworth, W. D., Jun., Savile-street
Kilgour, R. S., Anlaby-road
King, K., M.D., F.R.C.S., George-street
King, A., Mytongate
King, W. R., Ferriby
Kirk, H., 2, Ivy Arch, Newington
Kirk, T., Whitefriargate
Kirk, W., Chapel-lane
Kitching, A., M.D., Parliament-street
Krause, Dr., 11, Story-street
Krüger, J. F., Wright-street
Kuntzmann, Herr, Royal Chambers, Wellington-street

Lacy, J., South Church-side
Lambert, C. R., Albion-street
Lambert, H., Spring-bank
Lambert, W. A. (Hull Banking Co.)
Lambert, W. C., Bowlalley-lane
Larard, F., Bond-street
Lawrence, J., Dock Office
Lawrence, W. H., Angelo Villa, Coltman-street
Lawson, G., Newland
Lawton, W., High-street
Leach, G., Coburg House, Hessle

Leak, J., Bowlalley-lane
Leetham, Mrs., Anlaby-road
Leetham, E., Humber Dock-street
Lempriere, Capt., R.E., Bank of England
Leng, G. W., Holborn Mount
Lennard, G. H., St. John-street
Levett, Mrs. A., Park-street
Liddell, Mrs., Sutton House
Linde, J., Great Thornton-st.
Lindley, T., Coltman-street
Lofthouse, C., Albion-street
Logan, H., Station Hotel
Logan, S. C., M.A., the Grammar School
Londesborough, the Right Hon. Lord
Looke, P. (Dreyer & Co., St. John-street)
Loosemore, Rev. Canon, Aldborough
Lowe, F., Parliament-street
Lyon, Rev. E., 1, Elm-terrace, Beverley-road

Maas, F. T., 4, Lansdowne-terrace
Mackay, Rev. W. P., M.D., The Park
Macmillan, Mrs., 31, Albion-st.
Macnab, F., Great Union-street
Malcolm, J., 22, High-street
Mann, J., Newington
Marillier, R. A., M.I.C.E., Dock Office
Marsdin, Mrs., E. N., Woodfield House, Hessle
Marshall, W. T., Hutt-street
Martin, Capt. Thos., 30, Arlington-street
Martin, G. P., 10, Portland-place
Martinson, G., Bowlalley-lane
Massam, T., High-street
Mason, B. B., Beverley-road
Mason, S. B., Beverley-road
Massey, Quay-street
Maxsted, E. P., J.P., Hessle
Maxwell, D., C.E., Stoneferry
Mayfield, A., Stepney
Mc.Collin, W., Leonard-street
Mc.Cormick, Rev. J., Prospect-street
Meggitt, S. R., High-street
Merson, John, M.D., Borough Asylum
Metcalfe, C. L., Whitefriargate
Micks, R., Inland Revenue Office
Middlemiss, R., Parliament-st.
Middleton, Capt. John, High-street
Midgley, E., English-street
Milner, Mrs., 53, Lister-street
Milner, T. G., 5, Holborn Mount
Moorby, Thomas, Spring Bank Orphanage
Moore, J. H., Dock-street
Moran, W., Coltman-street
Mosely, S., Whitefriargate
Moss, F. B., Parliament-street
Moss, E. H., Ferriby
Moxon, C. R. (Yorkshire Banking Co.)
Moxon, B., Kingston-square
Müller, Herr (Mus. Bac.), 82, Prospect-street
Munroe, H., M.D., F.L.S., Charlotte-street
Murray, Spring-bank
Musgrave, B., Jun., Church street
Musgrave, S., Trinity House-lane
Myers, G., Coltman-street

Nash, J. P., M.A., Spring-bank
Nassau, Savile-street
Neale, F., Anlaby-road
Needler, W., Silver-street
Newmarch, Rev. H., M.A., Hessle Vicarage
Newton, P., 64, Charles-street
Newton, W., Prince's Dock-st.

Nichols, Rev. A. G., 9, Wilton-terrace
Nicholson, G. C., Prince's Avenue
Nicholson, R. H. B., Albion-st.
Nicholson, J. F., M.B., Albion-street
Nightingale, W. B., Market-place
Norman, T. A., Margaret-street
Norwood, C. M., M.P., Queen's Gate Gardens, Kensington

Oake, Miss, 4, Minerva-terrace
O'Donoghue, D. J., School Board Office
Oldham, J., M.I.C.E., Cottingham
Oldham, James, Anlaby-road
Ostler, J., Ferriby

Palmer, T., Junr., High-street
Park, R. G., Hedon
Partington, James, 43, English-street
Payne, Arthur, 2, Park Villas, Cottingham
Peach, R., Parliament-street
Pearce, T., Parliament-street
Pearse, Mrs., Belgrave-terrace
Pease, F., Trinity House-lane
Pease, H. J. R., Beverley
Pease, J. W., J.P., Hesslewood
Pease, A. B., Willerby
Peck, M. C., Market-place
Pepper, G., Boulevard (South)
Pexton, R., Town Hall
Pickering, A., 2, Montague-terrace, Bridlington
Pickering, W., High-street
Pickering, A., Lowgate
Pickering, B., Junr., Parliament-street
Plaxton, J., Whitefriargate
Plimpton, A. W., High-street
Pool, W., Percy-street
Pratten, W. T. (Earle & Co., Hedon-road)
Preston, H., Silver-street
Pryce, C.E., 3, Studley-terrace, Beverley-road
Pudsey, H. F., Anlaby-road
Pybus, W., The Park

Quicke, T. J., Charlotte-street

Rayment, W., High-street
Raynor, A., Trinity House-lane
Rawson, F., Humber-street
Read, T. L., Newington House
Reckitt, J., Hessle
Reckitt, F., Hessle
Reckitt. Fred., Williamson-st
Redfern, 2, Elm Tree-terrace, Beverley-road
Reed, P., S. Mary's Chambers
Reed, W. J., S. Mary's Chambers
Reynoldson, T., Queen-street,
Richardson, C., Junction-street
Richardson, C., Regent-terrace
Richardson, W. Spring-bank
Richardson, Fred., 5, Whitefriargate
Richardson, Ed., Post Office
Ridgway, J. A., Beverley
Rimmington, S., Blackfriargate
Ringrose, John R., Sutton
Roberts, Miss, Park Gate House
Robinson, Ed., High-street
Robinson, H., 112, Porter-street
Robinson, John, 2, Dock Office-row
Robinson, T., 22, Story-street
Robson, J. T., Bowlalley-lane
Rockliffe, Craven, M.D., 9, Charlotte-street
Rowney, T. W. F., Savile-street
Rowson, W. S., 10, Williamson-st
Runton, T. R., Hutt-street
Rutter, Jas., Anlaby-road

Salmon, A. L., Scale-lane
Saltmer, Jas., Market-place
Samuelson, Martin, M.I.C.E., Hessle
Sanderson, Alfred, Albert Dock

Sanderson, J. W., 185, Coltman-street
Sauer, Lieut.-Col., J.P., Anlaby-road
Scaping, Z., Trinity House School
Scherman, Oscar (Veltmann & Co.), Princes' Dock-side
Scott, Rev. Canon, St. Mary's Vicarage
Scott, J. S., Waterworks-street
Scarby, J., The Elms, Beverley-road
Seaton, John L., J.P., The Park
Sharpe, J. K., Waterworks-st
Sharp, E. T., High-street
Sharp, Henry, Parliament-street
Sharp, J. Fox., M.I.C.E., The Park
Shaw, J. S., Stanley-terrace, Anlaby-road
Shaw, John. (Bröchner & Co., High-street)
Shaw, Robert, Humber-place
Shaw, Jesse
Shaw, W. A. (C. C. Bröchner and Co.), High-street
Sheardown, E. W., Beverley-rd
Shenton, R., Anlaby-road
Shepherd, J. P. (Stamp, Jackson, and Co.), Parliament-street
Shepherdson, Welburn, Lowgate
Sherburn, I., M.B., Albion-st
Shipham, Miss Jane, 53, Park-street
Sibree, J. D., Bishop-lane
Simpson, F. K., Savile-street Chambers
Simpson, A., M.I.M.E., Alexandra-road, Newland
Simpson, H., Humber-street
Sissons, D., Granville-terrace
Sissons, R. J., Prospect-street
Sissons, T., Grosvenor-terrace
Sissons, T. H., Nithsdale-terrace
Sissons, W., Park-street
Sissons, W. A., Charlotte-street
Sleight, H., Silver-street
Smith, Miss A. M., Lamwath House, Sutton
Smith, D. R., Whitefriargate
Smith, G. R. (Leng and Co., Savile-street)
Smith, H., High-street
Smith, Lieut.-Col. Gerard, Tranby
Smith, T. R., Anlaby-road
Smith, T. J., F.C.S., F.G.S., Church-side
Smith, F. H., J.P., Sutton
Smith, T., York-parade
Smith, H. (Amos & Smith)
Smith, R. G., Cogan Chambers
Smith, Thomas, 4, Victoria-terrace, Anlaby-road
Smithson, T. A. (Hull Banking Co.)
Smithson, J. G., Beverley-road
Smurthwaite, E. C., 9, Whitefriargate
Souster, J., Scale-lane
Southern, Frank, 15, Wright-st
Southern, Thos., do.
Spafford, C. S. (British School, Day-street)
Spurr, M. B., Market-place
Starr, E., Chancery-buildings
Starr, R., Anlaby-road
Steedman, T. C., Robinson-row
Stephenson, L., Beverley-road
Stephenson, J. R., Waterworks-street
Stephenson, J., Regent-terrace
Stephenson (Roberts and Leak) Bowlalley-lane
Stevenson, W., Regent-terrace
Stirling, J. A., Hessle-road
Stoakes, B. M., Whitefriargate
Stocken, Hans Paul, 3, Morpeth-street
Stone, H. K., 74, Park-street
Stone, R. L., Queen's Dock-side
Stoole, J., Whitefriargate
Storry, J. A., Sutton
Stourton, G. W., High-street

Strachan, A., Willerby
Stratten, R., Lowgate
Stratten, T., Anlaby-road
Stuart, J., High-street
Stuart, D. C., R.N., Clyde-terrace
Summers, F., Kingston-terrace
Summers, W. A., Leicester-street
Sykes, C., M.P., Brantingham
Sykes, J., Lowgate
Sykes, T. E., Beverley-road

Tall, J., Whitefriargate
Tarn, W. J., Lister-street
Tattersall, James, Wellington-st
Taylor, G. A. R., Parliament-street
Tenny, J. T., Parliament-street
Tesseyman, W., Land-of-Green-Ginger
Tewson, J., Lowgate
Thirkill, J., Whitefriargate
Thelwall, J. A., 30, Spring-st
Thomas, W. B., 19, George-st
Thompson, J., Lime-street
Thompson, J. C. (Old Foundry, Green-lane)
Thompson, Thomas, Westbourne-terrace, Park-street
Thorney, J. J., Parliament-street
Thornham, W., The Park
Thornham, Miss, 43, Margaret-street
Thorp, F. W. T., S. Mary's Chambers
Thornton, F., 57, Charlotte-st
Todd, J., Swanland Hall
Todd, C. S., F.S.A., Town Hall
Todd, Capt., Trinity House-lane
Todd, Arthur, Green-lane
Toozes, Henry, English-street
Tothill, Wm. W., Holderness-road
Travis, T. H., Brough
Tulley, W., Linnæus-street
Turner, James, Coltman-street

Varley, Miss Annie, Cross Keys
Veltmann, H., Beverley-road
Vertue, Francis, Church-street
Vivian, Rd., Park-street

Wade, R. J., Hutt-street
Wade, John E., Woodhall
Wade, Joseph A., Hornsea
Walker, Miss M. A., Charlotte-street
Walker, Albert (Earle's Co.)
Walker, J., Parliament-street
Walker, W., 19, Pearson-street
Waller, Robert, Witham
Walliker, Samuel, Post Office
Wallis, J. G., 33, Albion-street
Wallis, G. D., 2, Boulevard-terrace, Anlaby-road
Walsham, Rev. C., Margaret-street
Walton, T., F.C.S., Bourne-street
Watkinson, F. W., 58, Prospect-street
Watson, William, Hedon
Watson, James, Hedon
Watt, John, 20, Morpeth-street
Weatherill, J. Bowlalley-lane
Webster, Henry, Borough Gaol
Webster, J. J., Dock Office
Weeke, P. E., 50, Derringham-street
Wells, Charles, Sutton
Wells, T., 31, Osborne-street
Wellsted, W. H., Ocean-place, Anlaby-road
Wenlock, Right Hon. Lord, Escrick Park, York
West, —. (Priestman's, Parliament-street)
Westerdale, Mrs. J. S., Springbank
Westgarth, T., Lime-street
Wheatley, W., Crown-terrace, Anlaby-road
Wheeler, W. W., Morpeth-street
Wheelwright, W. H., Springbank
White, W. T., Hedon

White, Major, Beverley-road
Whitehead, G., 31, Morpeth-street
Whiteside, H. H., Bowlalley-lane
Whiteley, J. W., Gladstone-street
Whitfield, G., Fountain-street
Whitfield, M., Bishop-lane
Whitfield, P. C., 1, Nile-street
Whitton, G., 52, Fountain-road
Wiggelsworth, Mrs. G. V., Albion-street
Wilde, T., Margaret-street
Wilkinson, J., 21, Walmsley-street
Wilkinson, Rev. G., M.A., 7, Baker-street
Wilkinson, W., 5, Coltman-street
Willatt, J., 27, Witham
Williams, J. B., 1, Mason-street
Willingham, W., 8, Lowgate
Williams, F. T., The Vittoria
Williams, E. B., C.E., Dock Office
Willows, J. G. W., Harley-street
Willows, J. B., Jun., The Park
Wilson, A. C. (Miss Bromby, Charlotte-street)
Wilson, C. H., M.P., Cottingham
Wilson, G., Whitefriargate
Wilson, E. J., Solicitor, Whitefriargate
Wilson, A. P., Town Hall
Wilson, D., J.P., Cottingham
Wilson, W., 19, Gladstone-st.
Winch, J., Carlisle-street
Winter, C., Beverley-road
Winter, R. H., 24, All Saints' street
Wise, E. T., Bank of England
Witty, T., Jun., Fountain-road
Witty, E. H., Town Hall
Wood, G., Beverley-road
Wood, J. G., 32, Spring-street
Wood, B. W., 15, Albion-street
Woods, C. F., 31, Whitefriargate
Woodhouse, J. T., Parliament-street
Woolcombe, Capt., R.N., H.M.S. Endymion
Wrigglesworth, E., Anlaby-road
Wright, B. B., Anlaby-road

17 SEASON TICKET-HOLDERS.

Audas, Thomas, Anlaby-road

Dawson, Mrs. A., Anlaby-road

Flodman, A., Anlaby-road
Foster, Miss E., Whitefriargate

Hickling, A. W.
Hurtzig, A. C.

Irving, Miss, Albert-terrace

Lynn, R. G., Dock Office

Mottram, Miss, Hessle

Nightingale, W., Market-place

Preston, W. H., Witham

Robinson, A. H., Infirmary

Spaldin, Miss, Jarratt-street
Sweeting, Miss

Thompson, Henry, Bond-street
Thompson, W. C.
Townend, Z. G., Lowgate

*** *Members will oblige by informing the Honorary Secretaries of any Change in their Addresses.*